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No. 5

## A MICROSCOPIC STUDY OF FAT IN THE CEREBRAL CORTEX \*

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Normal brains for histologic study are, in the nature of things, hard to obtain. In the first place, it is difficult to come to agreement on what constitutes a normal brain. Secondly, as Southard has insisted, the cells of a normal brain may purvey abnormal activities. Thirdly, of course, normal persons with supposedly normal brains for the most part live on through adult life.

The brains that have been perforce used are from general or special hospitals (cancer, tuberculosis or lying-in) or from accident cases, which latter are probably as near as possible to the ideal, only the previous habits of the individual fatally injured fade from the minds of interested persons, so that details remain obscure; but a brain from a young adult not insane, feeble-minded or criminal, non-alcoholic, nonsyphilitic or tuberculous, not the victim of chronic lead poisoning, electricity, acute or chronic infections, high terminal temperatures, who dies suddenly from accident (not shell shock) is preferred. This negative history is present in the first case reported in this paper (Special 6B).

### METHOD OF STUDY

Provided one has a normal brain, what is the best way to get the most information from it?

Investigators differ in their methods of approach, but according to the present viewpoint of Southard, who emphasizes the importance of investigation of the nervous system by all routes—direct and indirect—one must include inspection, careful description and palpation of the fresh brain, with bacteriologic studies of its fluid in conjunction with the same record of viscera and cord. Further, the

\* From Pathological Laboratory of the Massachusetts Commission on Mental Diseases, 74 Fenwood Road, Boston.

\* Read at the meeting of the American Medico-Psychological Association, Chicago, June, 1918.

brain is multiphotographed after ten days to three months' fixation in 10 per cent. formalin — including surface pictures with pia on, then with pia stripped; also transverse sections are made and these photographed, and then sections for microscopic study are made of twenty areas in each hemisphere. This method was followed in the present study.

Perhaps sections from each gyrus would be ideal, but these at least should be made. These sections should be examined by the Marchi methods, with one or two modifications, also by sudan III, cresylecht-violet and Weigert methods, as detailed in the following. A study of these sections forms a basis for comparison with each other case that comes to attention.

#### WEIGERT'S METHOD TO SHOW MYELIN SHEATH DEGENERATION

1. Formalin fixation.
2. Mordant from one to five days:
 

Bichromate of potassium.....	5.0 gm.	
Fluorchrome .....	2.5 gm.	Cool and filter
Boiling water (distilled).....	100.0 c.c.	
3. Dehydrate 70 per cent. alcohol to ether, one day each.
4. Thin celloidin, at least three weeks.
5. Medium celloidin, four days.
6. Thick celloidin, two days.
7. Mount and cut (70 per cent. alcohol). Time may be saved at this point by embedding sections between thin sheets of celloidin. See Weigert's method for serial sections.
8. Mordant II—overnight in incubator:
 

Fluorchrome .....	2.5 gm.	
Water (distilled) .....	100.0 c.c.	Cool and filter
Boil and turn out flame		Use nothing but glass instruments
Acetic acid—36 per cent.....	5.0 c.c.	
Copper acetate (finely powdered)...	5.0 gm.	
9. Wash off mordant in water followed by 80 per cent. alcohol.
10. Stain twenty-four hours in incubator 37 C. in
 

10 c.c. Weigert's ripened (six months or more) hematoxylin (a 10 per cent. solution in absolute alcohol).	
90 c.c. distilled water in which is 1 c.c. saturated aqueous solution of carbonate of lithium. Mix water and lithium together and add at time of using.	
11. Wash in running water two hours or more.
12. Differentiate in—
 

Borax .....	4 gm.
Ferricyanid of potassium.....	5 gm.
Distilled water.....	200 c.c.
13. Wash in running water ten minutes or more.
14. Dehydrate in—
 

(a) 70 per cent. alcohol.
(b) 95 per cent. alcohol.
(c) 95 per cent. alcohol, 3 parts; carboxylol, 1 part.

- (d) 95 per cent. alcohol, 2 parts; carboxylol, 2 parts.
  - (e) 95 per cent. alcohol, 1 part; carboxylol, 3 parts.
  - (f) carboxylol, 10 per cent.
  - (g) xylol.
15. Mount in Canada balsam.

## CRESYLECHT-VIOLET STAIN

(For formalin\* and alcohol—fixed material.)

1. If tissues have been in formalin more than two days, place in 70 per cent. alcohol three days (change after first day), and place in 95 per cent. alcohol four days (or longer).
2. Absolute alcohol, chloroform, chloroform paraffin—each one day.
3. Embed.
4. Cut at 6 micra.
5. Xylol (two changes), absolute alcohol (two changes), 95 per cent. alcohol, 70 per cent. alcohol, distilled water.
6. Stain in 1 per cent. aqueous solution of cresylecht-violet (filtered) forty minutes (incubator) or longer. Stain may be used several times.
7. Distilled water.
8. Differentiate in 95 per cent. alcohol, adding colophonium about ten parts (10 per cent. in absolute alcohol) if necessary (if alcohol has not been in wood), until background is white or nearly so.
9. Absolute alcohol (three changes).
10. Xylol (four changes).
11. Mount in balsam.

## FAT STAIN FOR FROZEN SECTIONS

(Fix in formalin twenty-four hours.)

1. Cut sections on freezing microtome and place in 50 per cent. alcohol for from two to three minutes.
2. Place in concentrated solution of sudan III, or scharlachrot (in from 70 to 80 per cent. alcohol) for from ten to thirty minutes (better thirty minutes).
3. Take out and put in 50 per cent. alcohol until an even tawny shade.
4. Put in distilled water.
5. Counterstain in alum hematoxylin—one minute or less for nerve tissue, *ten minutes* for other tissue.
6. Wash in water until blue. (Section may not be but on examination the nuclei will be.)
7. Place on slide and then clear in glycerin and mount in glycerin.

## MARCHI METHOD FOR STAINING FAT

1. Formalin fixation.
2. Bichromate of potassium, 2.5 per cent., from eight to fourteen days; change fluid at least once; keep in the dark.

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\*To secure best results a grade of formalin free from impurities should be used (for example, Merck's), and one should be sure that the tissues are placed in a fresh quantity the day after necropsy.



3. Transfer to osmic acid fluid:  
Osmic acid, 1 per cent. (1 part).  
Bichromate of potassium, 2.5 per cent. (2 parts) for eight days at room temperature, or five days at 37 C.; keep in the dark.
4. Wash in running water from twelve to twenty-four hours.
5. Dehydrate quickly.  
Use 70 per cent. alcohol, four hours; 80 per cent. alcohol, four hours;  
95 per cent. alcohol, twelve hours; absolute alcohol (two quantities),  
four hours; chloroform, four hours; chloroform paraffin, twelve hours.
6. Embed in paraffin and cut at 10 micra.
7. Clear in xylol (two quantities), one hour.
8. Mount in Canada balsam.

The material in this study consisted of three normal appearing brains.

#### REPORT OF CASES

CASE 1 (Special 6 B).—*History*.—The patient was an Italian, aged 27, married three years, father of three children and a mill-worker by occupation. He was an industrious steady worker, of a pleasant and even-tempered disposition, sociable and well liked by his co-workers. He was not alcoholic; there is no history of previous disease or venereal infection. According to his wife he had kept a gun under his pillow for *two weeks* and had threatened her. While asleep she shot him in the neck. He died, without moving, in a pool of blood. The necropsy was performed twelve hours postmortem, the body having been kept cold.

*Necropsy Findings*.—Trauma with fracture of the second cervical vertebra and hemorrhage in the neck. There was no evidence of disease or pathologic change in any of the body organs.

The brain was normal in appearance; it was preserved in 10 per cent. formalin solution.

CASE 2 (Special 41).—*History*.—This was a white man, aged 24, by occupation a farmer. He graded normal on the Binet-Simon intelligence test and his physical status showed nothing abnormal. The family, personal and venereal history was negative. The terminal illness was of twelve days' duration, with fever ranging from 99 to 104 F. with no mental symptoms. Death was caused by measles and bronchopneumonia.

*Necropsy Findings*.—The postmortem examination made one hour after death revealed acute changes in the lungs, kidneys and spleen. The heart showed right-sided dilatation and slight hypertrophy with early atheroma in the aorta and there was slight edema in the pia arachnoid. The brain weight was 1,720 gm.

CASE 3 (Special 42).—*History*.—This was a white man, aged 24, whose occupation was farming. He graded normal on the Binet-Simon intelligence test and was physically fit. Previous diseases were varicella at 17 and mumps at 19. Venereal history negative. The terminal illness was of fourteen days' duration with fever ranging from 102 to 103 F. There was presence of albumin and casts in the urine, but no mental symptoms. Death was due to measles and bronchopneumonia.

*Necropsy Findings*.—The necropsy was performed two and a half hours postmortem and revealed acute changes in the lungs, liver, kidney and spleen with moderate edema of the pia arachnoid. The brain weight was 1,430 gm.; it was normal in appearance.

## COMMENT

The material therefore consists of three normal appearing brains of about the same age and the same sex.

In the first case (Special 6 B) there is no evidence of any somatic disease. There was only the trauma which caused death. The other two cases (Cases 41 and 42) are similar in many respects, namely, death was due in each case to acute somatic disease of about twelve days' duration. The terminal disease was the same—bronchopneumonia; and the fever ranged toward the end to 103 F. in Case 42, and to 104 F. in Case 41. Case 41 was two days shorter in duration, but the fever was 1 degree higher. In both these cases there was a slight edema of the pia arachnoid membranes. The consistency of both brain specimens was said to be normal. The somatic changes were similar—acute bronchopneumonia in both cases. Besides this there were acute changes in the liver, kidneys and spleen, and in Case 41 slight hypertrophy of the heart with some dilatation of the right side.

These brains were likewise preserved in 10 per cent. formalin. Twenty blocks were then selected for examination from each hemisphere to be examined microscopically after treatment with Marchi, sudan III, cresylecht-violet and Weigert staining methods, making forty sections of each brain or 120 in the three cases. This report deals with the Marchi and sudan III reactions.

## METHOD OF EXAMINATION

The sections were first examined for fat pigment in the ganglion cells of the several zones of the cortex and then for changes in the vessels (Campbell's nomenclature). Results were tabulated for each layer of the cortex in each section, and comparisons made as follows: Between the different layers of each section; between the sections of one area with the other areas of the same brain; between the top and bottom, the front and back; between the external and central, and between the outside areas and included areas—as the transverse temporal.

Finally the cases were compared, area for area with each other. The areas in the direct path of arterial supply and venous exhaust were compared with those not so situated. The location, quantity, form and manner of distribution of the fat was studied within the cell. The fat in the vessels was studied in the same way.

## FINDINGS

CASE 1 (Special 6 B).—Sudan III. *Cells*.—In the forty areas examined in this case the fat was found distributed as follows:

1. Beginning in the first or plexiform layer we find no fat.
2. In the second zone it was found in two instances.

3. In the third layer there were but three instances of fat pigment.
4. In the fourth layer there was a marked increase over the first three zones. Pigment was found in twenty-six areas out of the forty.
5. The stellate layer showed fatty pigment in but one area—the left lobus pyramidalis.
6. The sixth again showed a very general incidence, scoring thirty-one out of the forty areas.
7. The seventh or fusiform layer showed pigment in ten regions.

*Comment.*—In the order, then, of greatest incidence of fat pigment we have (1) the sixth zone with thirty-one; (2) the fourth zone with twenty-six, and (3) the seventh zone with ten areas involved; the other layers were affected a relatively negligible number of times or were entirely free as in the case of the plexiform layer. It is evident, then, that the larger cells are most frequently involved (Fig. 1).

Taking the stellate layer which is almost entirely free, as a dividing line, we find in this case that fat occurs thirty-one times in the suprastellate and forty-one times in the infrastellate regions.

TABLE SHOWING NUMBER OF TIMES FAT APPEARED IN SEVEN LAYERS OF FORTY SECTIONS OF EACH BRAIN

Number of Layer	Serial Number of Cases—		
	Special 6 B (Case 1)	Case 41 (Case 2)	Case 42 (Case 3)
1	0	2	1
2	2	8	6
3	3	27	22
4	26	32	27
5	1	1	4
6	31	31	25
7	10	24	21

CASES 2 and 3 (Specials 41 and 42).—On account of the marked similarity in microscopic appearance these cases may be considered together: only in isolated instances do either Cases 41 or 42 compare more evenly with Special 6 B than with each other in fat content, and then only in a matter of degree.

In the first layer we found pigment in two areas of Case 41 and in one area of Case 42 compared with entire absence of pigment in Special 6 B. In the second zone we found it eight times in Case 41 and six times in Case 42. In the third zone we have a marked increase from Special 6 B—the apyretic case. In Case 41 pigment was prominent in twenty-seven areas and in Case 42 in twenty-two areas. In the fourth layer Case 41 furnished thirty-two instances and Case 42, twenty-seven. In this stratum Case 42 compares more nearly with the first apyretic case, but the difference between any two cases is comparatively small.

In the stellate layer one instance occurred in Case 41 and four in Case 42. So here, contrary to the fourth zone, Case 41 compares more evenly with Special 6 B, and Case 42 stands alone with a slight increase. The sixth layer is again more evenly involved in all three cases. Thirty-one areas in Case 41 and twenty-five in Case 42 showed fatty pigment. But here again, as in the fifth zone and contrary to the fourth zone, Special 6 B and Case 41 compare more closely, each showing thirty-one instances of pigmentation. The seventh layer is remarkable that in comparison with the first case it recalls the third layers. Case 41 showed fat in twenty-four regions, Case 42 in twenty-one regions, whereas in Special 6 B but ten areas could be said to contain fat.



Again taking the stellate as a dividing point we find here, contrary to the nonfever case, that the suprastellate layers contained more fat than the infrastellate, this reversal in the balance being due to the large increase in fat in the third zone. Thus we have pigment constantly present in the fourth and sixth layers in every case.

In the fever cases we have a marked increase in fat in the third and seventh zones with negligible increase in the second, and in Case 42 in the fifth layer. There was no considerable difference in the amount of fat in the individual cells of the fourth and sixth layers in the three cases. Thus in the fever cases the added amount of fat was demonstrated in the neighboring third and seventh layers. It would be desirable to study further the reaction of the cells in the third and seventh layers in similar acute conditions.

#### DISTRIBUTION, FORM AND QUANTITY OF PIGMENT IN THE INDIVIDUAL CELLS

We have found fat irregularly distributed in the cells, but in a general way, in the periphery. The nucleus is never displaced. In some instances the pigment is found bunched at one end or on one side of the cell, sometimes in the fundus, again encroaching on the axon. In other instances, it is more evenly scattered about the periphery of the cell. It is found in the form of minute droplets of varying sizes. The droplets do not coalesce, but keep their spherical form even when closely packed at a given point.

The quantity of fat varies but slightly in different cells in the same region, and comparing the areas we find no marked difference in the number of layers involved or in the fat in the cells from before backward and from superior to mesial surfaces. From above downward and inward (included surfaces) there is an increase both in the number of layers involved and the richness of fat in the cells.

The findings with the Marchi method duplicate those of the sudan III with added sensitivity (minute droplets in cells of all layers and in glia cells).

#### FAT IN VESSELS

Fat was found more generally in the vessels of the cortex, but less frequently in the white matter. The location of the fat in the vessels was in certain segments of the walls in the three cases, outside the endothelial lining and in intramural phagocytes. The endothelial cells were not swollen. The fat in the vessels was not found in droplets, but it seemed to coalesce and appeared in variously shaped and irregular masses, often at bifurcations or near branches, being irregularly distributed, some twigs entirely fat free. This irregularity may be correlated with the peculiar anatomic structure of the cerebral vessels.\*

\* Quain's Anatomy.

## COMMENT

The question of all the integral elements in normal nerve cells is not here discussed. Many will question the value of the Marchi method for demonstrating fat on the ground of hypersensitivity. Neubach (quoted by Biondi<sup>1</sup>), for instance, says any compound having a double bond of carbon will reduce osmic acid. The close duplication of the cell picture in sudan III which is soluble in fat would seem for optical purposes to be indicative that the nerve cells do contain pigment which stains by both methods. If we omit the completed discussion of variables which reduce osmic acid and those things in which sudan III is soluble, we can record freely the results of the application of these two widely known staining methods.

Mallory<sup>2</sup> states that "the presence of fat in the nerve cells is always a sure guide to disturbance of metabolism. In the cell body it must be distinguished from the pigment granules which are also stained by osmic acid but less intensely."

Alzheimer<sup>3</sup> paid especial attention to the *location* of fat in the cells. In young adults he found it clumped in masses about the periphery of the cell, in the aged it was near the nucleus.

Biondi,<sup>4</sup> writing in 1914, makes a notable review of literature touching on histologic studies of the nervous system with special reference to the lipoids, and emphasizes the presence of plastosomes which the French authors believe are formed in albuminoid substratum linked physically or chemically with lipid substance. These lipid inclusion structures are either diffuse or granular in the normal nerve cells, but are absent in axons and dendrites and in the nerve cells of guinea-pigs and rabbits. It is generally considered that these lipid inclusions are products of cell metabolism of a regressive nature. He concludes that in all probability our technical methods are capable of demonstrating only a part of the lipoids of the elements of the nervous tissue and that another part escapes our histologic observation, also that the part which is demonstrable is variable.

Cotton<sup>5</sup> in this paper states he has had access to thirty probably normal cases, six of which he reports on the microscopic findings, and

1. Biondi, G.: Lo stato attuale degli studii estologici sui lipoidi del sistema nervoso, *Riv. ital. di neuropat.* Catania, **7**:247, 1914.

2. Mallory, F. B.: *The Principles of Pathologic Histology*, p. 627.

3. Alzheimer, A.: Nissl-Alzheimer Histologische and Histopathologische Arbeiten, **3**: p. 401.

4. Biondi, G.: Lo stato attuale degli studii estologici sui lipoidi del sistema nervoso, *Riv. ital. di neuropat.* Catania, **7**:247, 1914.

5. Cotton, Henry A.: Fatty Degeneration in the Cerebral Cortex in the Psychoses, with Especial Reference to Dementia Praecox, *J. Exper. M.* **22**:492, 1915.



Fig. 1.—Photograph of a Betz cell from Case 1 (Special 6B), showing the disposition of pigment. The nucleus is centrally placed. Marchi method.



DRAWING TO SHOW PERIPHERAL PLACEMENT OF PIGMENT IN BETZ  
CEREBRAL CORTEX IN YOUNG ADULTS

Plate 1.—(a) Drawing of a Betz cell from Case 1 (Special 6 B), showing  
the peripheral distribution of the pigment. Sudan III stain.  
(b) Same. Marchi method.

PLATE 1



DRAWING TO SHOW PERIPHERAL PLACEMENT OF PIGMENT IN BETZ  
CEREBRAL CORTEX IN YOUNG ADULTS

Plate 2.—(a) Drawing of a Betz cell from Case 2 (Special 41), showing the pigment deposit at periphery of the cell. Sudan III stain.  
(b) Same. Marchi method.



PLATE 2



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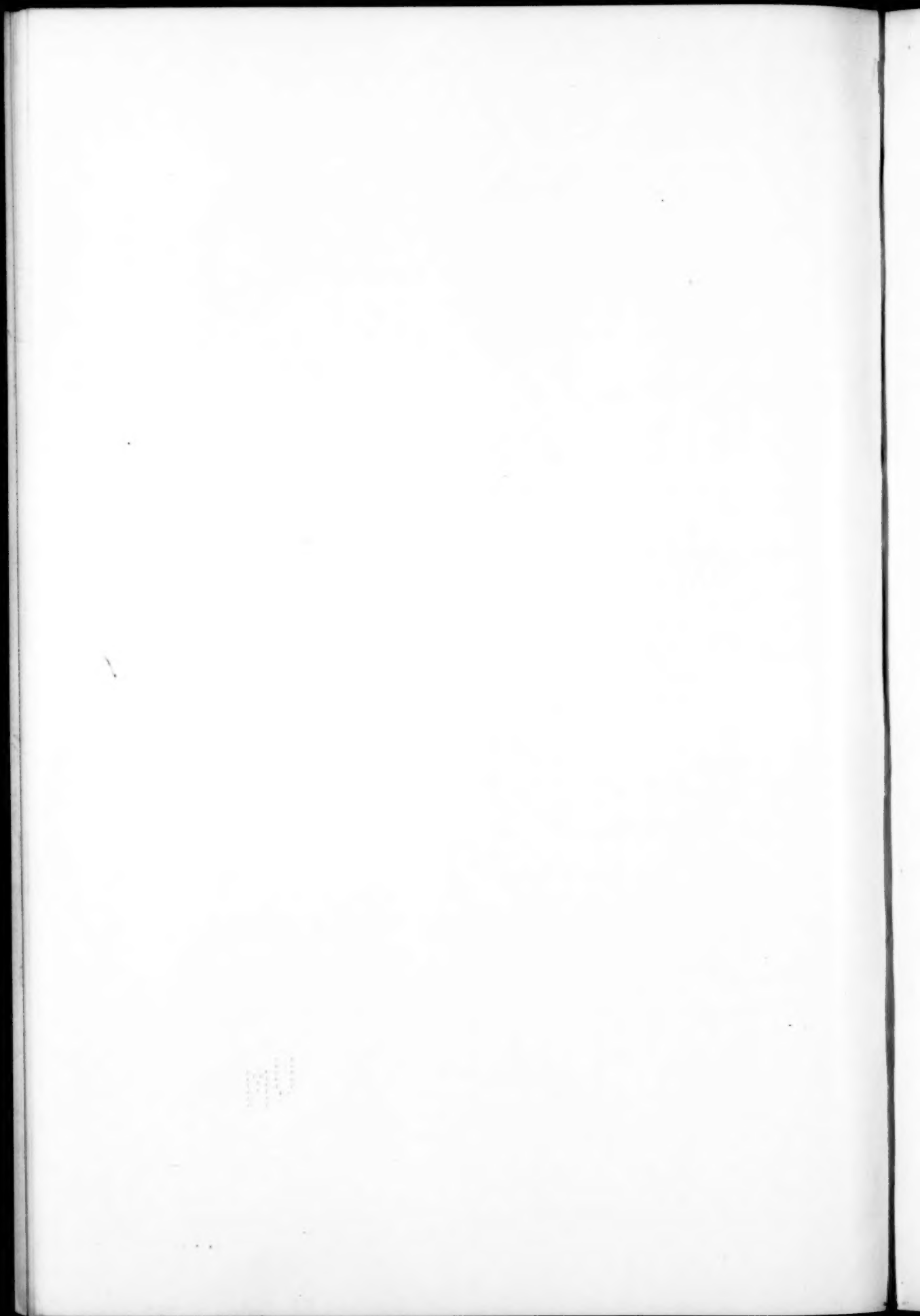
DRAWING TO SHOW PERIPHERAL PLACEMENT OF PIGMENT IN BETZ  
CEREBRAL CORTEX IN YOUNG ADULTS

Plate 3.—(a) Drawing of a Betz cell from Case 3 (Special 42), showing the pigment at the periphery of cell. Sudan III stain.

(b) Same. Marchi method.

PLATE 3





states that in the new-born no fat was found in the ganglion, glia or cortex, and that in a boy, aged 16, killed by electric shock, there were small quantities of lipid material present in the ganglion cells, but none in the glia or in the vessel walls; that a convict, aged 30, electrocuted, showed few (from 3 to 10) fatty granules at the base near the border in the ganglion cells, but the glia cells were negative. A negro, aged 27, electrocuted, showed no fat in the ganglion cells, and a patient who committed suicide, aged 36 (unhappy family relations), showed a small amount of fatty deposit. These patients under 40 years of age showed little or no fatty pigment, but in a man, aged 70 (circumstances of death not given), showed noticeably augmented lipid pigment in the ganglion cells.

#### CONCLUSIONS

1. In three young male adults, not insane, gross examination of brain showed no abnormalities.
2. Examination of sections from twenty areas in each cerebral hemisphere stained with sudan III and Marchi's method showed fat present in some degree in nerve cells of all layers (Campbell's nomenclature).
3. Fat was found by far more frequently in the fourth and sixth layers — from 63 to 80 per cent.; the next most frequent location being the seventh zone — 25 per cent.
4. Fat was found in negligible amounts in first, second and fifth layers.
5. In the two cases with terminal infection there was a remarkable increase in fat in the third and seventh layers — from 53 to 65 per cent. — as against 7½ per cent. in the third layers, and 25 per cent. in the seventh layer of the apyretic case. Higher temperatures affect third and seventh layers.

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## A PSYCHOLOGIC STUDY OF STEALING IN JUVENILE DELINQUENCY

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In the present paper no attempt will be made to consider the so-called benign types of ordinary stealing, as these are more or less conscious and purposeful acts common to many individuals of all ages. Nor will special emphasis be placed on fanciful stealing such as the kleptomaniacs, where the objects stolen are often of highly symbolic significance such as studied originally by Krafft-Ebing,<sup>1</sup> and more recently by Stekel,<sup>2</sup> Albrecht,<sup>3</sup> Riklin<sup>4</sup> and Pfister<sup>5</sup> as manifestations of neuroses, and by Gross<sup>6</sup> as a compulsive act in a manic-depressive, or by Chlumsky<sup>7</sup> and Sommer<sup>8</sup> in feeble-minded persons whose defects were either inherited or acquired. The few cases which will be reviewed here are confined to persons who have stolen money or other valuables without the ordinary patent motives of simple covetousness or revenge, and who often find themselves overcome by the temptation in face of the apparent knowledge that the act is wrong. Purely as an impulse the act is not so very dissimilar to that of fanciful kleptomania, nor is it often essentially different from the purposeful stealing of everyday occurrence as found in poorly inhibited individuals. On the whole, one may say that the main characteristic of the persons here considered is stealing money and consciously committing other antisocial acts of a petty sort mainly as a consequence of having no well grounded sense of property rights. Usually these individuals show predominantly many other poor adaptations to authority and law from earliest life and they appear unable to thoroughly grasp the importance of making the proper submission and compromise with parental discipline. I think it must be freely admitted by every one that the whole problem of the cause of stealing as an antisocial trait in juvenile delinquency is still in a chaotic state. There are

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1. Krafft-Ebing: *Psychopathia Sexualis*, ed. 13, 1907.

2. Stekel: *Nervöse Angstzustände und deren Behandlung*, 1908 and 1912.

3. Albrecht: *Zur Psychologie der Kleptomanie*, *Zentralbl. f. Psychoanalyse*, etc., May, 1913.

4. Riklin: *Zentralbl. f. Psychoanalyse*, 1911.

5. Pfister: *Die Psychoanalytische Methode*, 1913.

6. Gross: *Das Freudsche Ideogenitätsmoment und seine Bedeutung im manisch-depressiven Irresein* Kraepelin's, Leipzig, 1907.

7. Chlumsky: *Vierteljahrsschrift f. gerichtliche Medizin*, 4: 1892.

8. Sommer: *Diagnostik der Geisteskrankheiten*, Vienna, 1901.

some investigators who look for the root of these trends entirely in the make-up of the youth himself; they count him either a moron, a subinhibited mental defective, or a constitutional psychopathic inferior—whatever that term may just mean. Others greatly favor the idea that the parents and home environment are largely responsible for the development, if not for the actual implantation of the unruly or unmoral traits of character. Usually neither group neglects to thoroughly indict the family stock for the delinquencies found. They find in the family history certain vague though pertinent psychic or neuropathic traits, and, failing to discover a proper cause for the delinquency per se in the life history of the youth or his immediate environment, they apparently employ the heredity factor as a last resort. No sooner, however, does one undertake to investigate a series of such youths than he is impressed when all the above views are requisitioned to interpret juvenile delinquency, there are many more subtle forces at work than those usually obvious on the surface. Some of these obscure causes may be illustrated.

Apropos to our present study are Healy's<sup>9</sup> investigations of mental conflicts and repressions in delinquent children. He analyzes the acts of stealing money to sex delinquency and the incomplete mastery of the latter. For instance, one of his cases, that of a boy, was taken from his home environment and evil companions and was cured of his delinquency. Apparently, Healy's case was a conversion or substitutive mechanism of lying and stealing, the result of unsuccessful attempts to repress the sexual trends. In a long series Healy found surprisingly often concealed sexual conflict as well as defects in parental discipline and lack of proper filial-parental relations. He also cites several cases in which mental conflict grew out of the child's discovery from outside sources that a previously supposed parent was not really such. However, he does not specially mention cases in which antagonism to the father and desire for childish revenge on this parent was a cause for stealing as shown in my cases.

#### ILLUSTRATIVE CASES

CASE 1.—A boy of 15 was recently seen by me at the request of one of the visiting teachers of the Board of Education. He played truant from school and stole, and had done so for several years—in fact, ever since his father deserted the family. The mother herself had become embittered because of her marital troubles and went to live with her mother. Soon after the boy, when 11 years, stole so much from his grandmother and her immediate family that he and his mother had to go elsewhere. The boy's great fault was in concealing his thoughts and various daily activities from the grown people, and he was always uncomfortable in the latter's presence. In fact, he was

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9. Healy: *Mental Conflicts and Misconduct*, Little, Brown & Co., 1917.

most secretive in any inquiry about his whole life. After the more obvious faults in the home and school were set right and the boy permitted certain liberties and pleasures, his conduct improved; yet he did not obtain a good vigorous activity or proper adaptation to parental authority. He still lied and was sly. When made to join the church choir he stole from the church, and when forced to attend a special school he stole from that.

A frank talk with this boy showed that he failed to make any good compromise with discipline and authority. Unfortunately, with only a partial reconstruction of habits in progress, the boy was lost to view. It was learned later, however, that he had never adjusted himself to the father's authority; when the father deserted the family the boy failed to adjust himself to his mother, who beat the boy even more unmercifully than his father. Finally the grandmother treated him even more strictly, and he stole and otherwise showed dilapidated conduct in her home until he and his mother were obliged to leave. The boy apparently was not consciously clever enough to know that his stealing brought about the separation.

CASE 2.—A boy of 10 who was the recipient of whippings administered by his father had sharp conflicts, and first began to steal from the father after punishments at 8 years. Gradually he grew sullen and revengeful. He then began to steal from the proprietor of the delicatessen store where he worked. The proprietor undertook severe discipline also. At 10 he stole from a teacher who was strict with him and whom he specially disliked. In this instance the conflict with authority was all quite conscious and easily reprieved by adjusting the home and school life.

CASE 3.—The next instance is one of incorrigibility and stealing in a girl, aged 13, much like a series of cases reported by Dr. Healy. She began her disobedience and stealing at 11, soon after a playmate tried to induce her to go to the parks with boys and get money from such associations. She refused, yet wished very much to have the money to spend which her evil playmate displayed. She underwent mental torment in this moral conflict, but finally repressed it and became delinquent and stole only when she failed to be promoted in her class. She then took small sums of money whenever she came across them. The child says, "Father, mother and teacher say 'Don't,' 'You mustn't,' and then something inside tells me to be bad and steal. If I wanted to I could be the brightest girl in school. I took things probably once a week—about as often as the other girls went to the parks with boys, but I never went with the boys."

A case in which the causes for the delinquency were more complicated and seemed in part due to inability to properly adjust to the revolt at puberty may be cited in outline.

CASE 4.—An only child, now 19 years old, unexpectedly underwent an entire change of personality at puberty. Previously he had been sweet-tempered, obedient and affectionate. At 14, he "flared up" and declared he would no longer attend Sunday school. Immediately after this "astonishing rebellion" he insisted more or less on having his own way, and became smart and cocky. He not only revolted against parental authority but behaved in the same way toward the head master at private school. Induced to join the church he began to lie, refused to study, and at 17 was incorrigible and sly. He was expelled from school for theft. When taken to task for his misconduct he was indifferent, "as though he possessed no moral sense." When asked the

reason why he stole he said the other boys had lots of money to go out with the girls but he hadn't, and one could not properly entertain them without money. He then insisted on leaving preparatory school and going West, even forfeiting prospects of an inheritance by so doing. He was finally allowed to go West, and was apparently doing fairly well at an inferior occupation when he was again placed under the guidance of church influences, and he again became dissipated and negligent of his personal and social obligations. He lost his job and drifted about from one position to another, losing them largely because of carelessness and indifference to his work. The minister and other persons connected with the church who had been looking after his welfare, while away from home, washed their hands of all responsibility and soon after this he "braced up" and secured a job of his own finding. He now writes his parents that he has learned his lesson, is willing to come home and settle down to work and abide by the regulations of home and school, adding that he is *willing to do just exactly as father directs.*

*Comment.*—Here we find the first inability to adapt to the parental authority at being forced to go to church and when he was forced further to join the church his moral dilapidation was quite complete; and though he did fairly well "out West," he broke down again when the guidance of the church was reintroduced. Probably the moral inhibition superadded to the parental direction was the main cause for breaking down his good social conduct. Apparently this case is a common one of revolt at puberty. The very closeness of filial-paternal attachment in early childhood made the revolt at puberty the more violent. When the revolt was coupled with sexual repression and difficult adaptation to this social and antisocial demand, he extended his dilapidation of conduct to lying and stealing as well as incorrigibility and truancy. The final outcome is not yet, although the boy seems to be on the road to making a proper adjustment, a compromise with the home authority, and has expressed his willingness to abide by the rules of society. It may be added that this young man has very recently entered a noncombatant part of the governmental activities, but shows still an incomplete social adjustment but has so far as known stolen nothing for the past two years.

One of my cases, a woman about 24 years of age, seems to be analogous to the case reported by Dr. Glueck of a latent homosexual complex.<sup>10</sup> Again, as in the previous instances, the final analysis cannot yet be supplied. The case, however, is worthy of more extended study, which will be attempted.

CASE 5.—The girl was a fairly clever paid worker in a social settlement. Her appearance was pleasing, her work in general good, and everybody liked her. She stole only from women, and those, too, were her best friends. So gracious was she in her conduct in spite of her peculations that not only did she continue to be very fond of her victims but they reciprocated her affections. In consequence, inquiry had to be undertaken with greatest delicacy lest all parties concerned might have their "feelings" hurt. It was only after a perfectly impossible series of thefts that "all hands" agreed to a partial psychologic investigation. The girl's old family nurse reported that she showed no special peculiarities in childhood, learned easily and stood high in her studies.

10. Glueck: "Studies in Forensic Psychiatry," Little, Brown & Co., Boston, 1916, p. 239.



Her education was interrupted at the end of her first year at college by dismissal on account of theft. She had a short, benign attack of chorea at puberty.

As a young girl she had normal powers of observation and concentration. She was quick and impulsive and was said to have been too ambitious to attain physical and mental vigor for her physical endurance. She was practical, active and serious-minded, bashful in the presence of men, but friendly and affectionate with women. She was sympathetic, kindhearted and generous with girls. She resembled her father in physique and her mother in temperament; for the latter she has always shown decided preference. In general, she had a keen moral sense. She always showed emotion when detected in taking money, putting her arms about her victim and crying in apparent genuine concern. She spoke frankly about her thefts from her "dearest friends" both at college and in business associations. She claimed to have stolen first without cause, but soon claimed it was really to help her invalid sister, but later thefts lacked this motive. In fact, she now has an income from inherited property as well as drawing a salary, and is at a loss to account for her thefts. She volunteers the statement, "I never have cared anything about men, but am deeply interested in girls. One college friend from whom I took small sums was like my business associate, of whom I am now very fond." When pressed rather closely she says, "Yes, I suppose these girl friends do have great influence over me. I feel nearer to them than to my mother." This last was said with the emotional stress of one speaking of affections stronger than ordinary friendship.\*

I think one may safely infer when the act of stealing occurs without apparent motive, at least sufficient for the offense as ordinarily found, that it is probably unconsciously conditioned either on a defect in adaptation to authority, to sexual conflict and repression at puberty,

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\*It is interesting to see what becomes of these patients under a system of wise care and attention by lay individuals. The following letter recently received explains in part, and is written by a woman conducting a girl's school in Massachusetts:

"On visiting New York just at the time of the difficulty this girl had experienced, she told me it was her intention to 'drop out of sight,' this after her detailed account of her trouble. She decided to return with me, and for three months my anxiety for her was great. I kept her with me continually, never alluding to her life in New York and keeping her confidence strictly. Feeling that she must have some interest in something radically new, I arranged with a teacher at one of the physical culture schools to have her take a course of study. She took the two years' course, and I arranged that she apply the knowledge she had obtained in our own school. All the time for more than two years I kept in constant touch with her, never permitting her to be far from me and giving her all the love and care I would my own daughter. Away from her father, she has developed honor, established a habit of truthfulness, and is now a trusted helper."

Undoubtedly the sublimation, possibly a homosexual transference, seems to be working satisfactorily. However, a more genetic rationalization of the real unconscious motive should be given. Finally, one may say in this case that under ordinary conditions perhaps this girl will not break down into her old delinquencies.

or it is a vicious homosexual theft-substitution for the offender's own sex, as in this last instance.

#### SUGGESTIONS AS TO TREATMENT

The line of therapeutic procedure is obvious in all the foregoing, that is, explanation by analysis, conscious guidance, and a sympathetic after-care and training. The enormous demand and difficulty of sublimation in the homosexual victim of the theft habit, makes correction extremely difficult. In fact, it is to be doubted whether the homosexual is ever able to sublimate sufficiently to keep him from social conflicts, or from a neurosis more or less dominant throughout his life. His task of adaptation must be so enormous that his life is destined never to be a contented or happy one.

I cannot too forcibly insist on the importance of studying the child's *adaptation to parental authority* when delinquency and stealing begin at a very tender age, as a basis for adjustment to all law and order in the future life of the individual. An example which exquisitely illustrates my thesis is the following, given at length.

#### DETAILED REPORT OF A TYPICAL CASE

CASE 5.—*History*.—The case is a rather common one in its clinical expression, and is that of a young man in middle adolescence. He had a fairly normal physical and mental development up to 5 years of age, when he more or less abruptly began to lie and practice deceit. Soon he began to take all sorts of things which did not belong to him—knives, scissors, thimbles, and various objects he found lying about the house. He had been neither a sensitive nor a passionate-tempered child in infancy, and as he grew up he was quite obedient to the home discipline under ordinary circumstances. The father tried to correct his lying and stealing by talking to him, but, in the father's words, "he did not seem to grasp the full import of these talks nor did he seem to realize that he could not have anything he wanted whether it was his or not." After the father's talks and mild physical punishment the boy was "terribly sorry," and would show no further misconduct for weeks at a time, when he would relapse to his former misbehavior. The parents hoped he would "grow out of it," and thought his unusually rapid growth had something to do with his moral delinquencies.

At 9 years he was nearly 5 feet 4 inches in height. From 5 to 9 years of age he had been a fair student at school, but his studiousness had gradually decreased until his main interest in school life was in athletics with the boy group. He became hyperactive and wanted to be constantly on the move. He had little patience with his teachers and practiced all the quieter forms of deceit and chicanery of the poor student. His growth continued to be rapid, and at puberty he was nearly 6 feet in height. His lying and thieving propensities grew *pari passu* with his years, and as he grew older he coveted things of more importance. When his delinquencies were found out he appeared as remorseful as ever. His moral defects clouded the activities of his daily life but little until puberty; he then began to revolt at the school discipline although outwardly he appeared to be a fairly well behaved boy.

He was changed from the grammar school, where he had grown quite unruly under a woman teacher, to a private school with a capable male instructor, but made little change in deportment. He stood well with his boy companions in spite of the fact that he helped himself to their wearing apparel and other personal belongings; no special deceit was resorted to in these misappropriations. When taken to task by the head master for a larger theft he played truant and tried to lie out of it. Once he fooled both his parents and the head master for a week's nonattendance at school. He steadily lost ground in his classes and was put back, but these inability to progress seemed only to lessen his ardor for a school career. Otherwise his hopes and ambitions in life were much like those of other boys of his age and station.

At 14, when rather severely taken to task he ran away from home, leaving a "touching appeal" to explain his disappearance. He was soon located in a neighboring city and brought back home, apparently quite willingly. Soon after this episode he had an attack of chickenpox which caused him to lose six weeks at school. While convalescing he had two fainting attacks (probably due to anemia); the restrictions entailed in caring for his full restoration to health caused him to fail in his examinations, although he was warned that this might occur. A few days after this failure in promotion he eloped from school, borrowed a horse, and, dressed in a sort of cowboy wild west outfit, wandered away in the country. He took no special pains to conceal his itinerary or his whereabouts. When trailed and found three days later, he was living in the wilds, had a tent and was paying, begging or stealing for his necessary articles of food. He had borrowed the horse for a day, and when it was not returned search led to the boy's apprehension. He seemed not to recognize the gravity of his failure to return the horse, and acted rather callous and unfeeling about the whole matter. Only when pressed rather sharply as to the details of this escapade did he lie, a rather common reaction when he was cornered.

*Comment.*—The foregoing brief summary was duly verified from several sources at the first examination. The boy was found to be a great hulking fellow, much in advance of his years. Although physically and mentally restive under examination, he was apparently frank but rather affectless in going over the history of his delinquencies. His eyes, usually shifty, would light up with boyish enthusiasm as he unfolded a rather plausible scheme for his future life and ambitions, which was to go to Texas and take up ranch life under the direction of an old friend of the family.

*Examination.*—The physical examination was completely negative. Mental tests showed this youth to be clever and resourceful; he had a logical memory with no mental defect; he was about three years in arrears in his school studies but in advance of his age in performance tests. His lack of interest in school made his attention and power of sustained concentration on his studies poor. He had a very clever ability to use tools, was quite an expert garage man, and drove the family automobile. He was self-reliant. He easily learned to swim, dance, and shoot. He was easy to get acquainted with and had the faculty of making many friends, but was not over-particular in his choice of companions. Persons engaged in outdoor activities he chose to cultivate particularly. He was always rather egotistical and wanted the spotlight on all his athletic acquirements. Even as a young child he wanted his own way, and used to tease a good deal to get it. As a boy under 5 years of age, after listening to especially exciting narratives of adventure he would be restless in sleep, had nightmare, dreamed of Indians and of being chased

by snakes, etc., but for several years he has had no remembered dreams and sleeps "like a log."

On being asked how he handled the home discipline, the boy remarked, "When things didn't go well, and they sort of knocked me down and out, I frequently thought of running away and earning my own living. I took but one flight, and I enjoyed it." When he is plotting to do something, or has done something he ought not to, he talks very fast and volubly, sparring for time to find a way out. He chiefly craved the sympathy of his mother, his sister, and the old family cook; the latter, especially, gave him money for his various escapades as a child when the father objected.

*Conduct While at School.*—A digest of the opinions of the head master of a preparatory school regarding this boy a few days after my preliminary examination of him is as follows: "I am very sorry to say that the boy failed in his entrance examinations pretty hopelessly in both algebra and English. We did not expect much, of course, on the technical written papers; his entrance examinations consisted, therefore, principally of an effort to determine whether he was ready to buckle down to good, severe work. I am sorry he did not pass this test either. He manifested considerable interest in stock, which is a subject for our seniors only, and said frankly that he would like to ride a horse, but didn't care much about wielding a hoe, and that he hated chickens. I told him the question was whether he wanted to take off his coat, and get down with the boys of the first class, who were younger than he, and really get a thorough foundation and go right through the whole four years of our agricultural course. He seemed to feel a little hurt, that I thought he was unwilling to hustle; but the impression he made on all of us was rather that of a somewhat elegant dilettante. He hired an automobile to bring him over the short distance from the station, and in general seemed somewhat of a kid-glove farmer. However, we felt that he was something of a good sport in that if he got roused he might put the work through rather than quit. At the same time, he showed no real or vital interest to do anything except the small part of our course that happened to be of interest to him. As there were enough boys to fill up our enrollment who did very much better on our technical examinations and showed a more willing spirit, we felt, naturally, we ought to take them and reject this boy."

*Subsequent History.*—A short while after this poor showing, the boy was placed in the training camp to be under close observation. He made good contact with the other boys but frequently took their ties and canes without asking permission. He neglected his studies and crafts work to talk and walk with girls at a neighboring hotel, but while with them his deportment was quite correct although somewhat "rattlebrained" and "kidlike."

After the first two weeks of minor delinquencies at the club camp, he took on two occasions a fair sum of money from the clothes of some of the summer guests near the camp. It is interesting to note the final confession the boy made of his temptation and final downfall in the theft. "For days I had been thinking about money, especially at night when I would go to bed. I thought of all the good things I could get. It was all selfish on my part. I wanted to purchase candy, pipes and cigarets, and neckties for myself. For several nights I thought this all over. I thought that the bath-houses would be pretty easy and then I thought how wrong this was, and for a couple of nights I put it out of my head and then it began again, for no particular reason that I know of, because I did have some money with me. I went to



the bath-house one day and saw the door open and took the money I found in some clothes there. Then I saw that I got away with this, and went in again on another day and took more money. At first, I would see the door open and then walk away because I would think how wrong it all was, and then something would come over me, like a wave, and I would put the thoughts away about it being wrong and would then go in and take the money. I never thought of the legal consequences and don't think I ever imagined I would get caught. I had no antagonism against the men I took the money from—in fact, I didn't know one of them at all. I thought if accused I would bluff it out, and I tried that but it failed; then I felt sorry and ashamed. I don't think the idea of spending money on the girls had anything to do with it—it was all for myself." While the boy gave this information frankly, and with downcast eyes, he did not seem to appreciate the seriousness of his offense at all.

After the foregoing episode the whole series of delinquencies were gone over in minute detail, especial inquiry being made on the first remembered act at 5 years of age. It was difficult to get the patient to submit to a painstaking scrutiny of his early life at first. Finally, the acts of stealing led to the early conflicts with the father about punishments for disobedience and lying. At the outset of his initial acts of disobedience he argued with the father regarding the injustice of the punishments, but later when silenced by the father he grew sullen and had a "hang dog" expression. Still later, after other acts when requested to explain he refused to make any defense, excuse or apology. As he said, "I thought I had best take the punishment coming to me and get the matter over as soon as possible, which I did." Further association on his acts and the rights of property in particular brought out the statement, "Why, you see when I was just a little kid I got the idea that all the property in the house as well as everywhere else belonged to father. If he didn't actually own it, it was subject to his control or disposal." It was shown further that even the more intimate belongings of the mother, such as scissors, rings, thimbles, etc., were really the father's and that when he took things he felt that his father would have to pay for or replace them. When he received punishment he never went to the mother for consolation but to the old colored cook who had been in the family employ for so long that she had taken the family name. As a child he went to her for sweets and all sorts of special favors which she was only too glad to furnish. The boy was the oldest and for a long time the only child in the family. Occasionally the cook sided against the boy and agreed that the father's discipline was right, and after a long talk and some "sweet blandishments" he became reconciled (outwardly) to the father's punishments. Further, it was shown that the boy practically took money or other property solely from the male sex. In one instance he stole a half dollar from the cook. When taxed with this apparent ingratitude the boy hastily added: "But I knew father would have to pay her back and a little more for all her kindness and pains in bringing me up. You see, I sort of looked on the cook as my mother in spite of her being colored."

As he grew up his rebellion against authority was shown to be really against the father. He said, "Some of the people who had authority over me at various times looked like father, especially the school master and Mr. X.; both treated me very nice and acted just like a father to me, and I took the most from them. After I took the money from Mr. X. I felt as though he had done something against me, instead of the reverse, and I



never wanted to go with him after that." From the age when he first began to steal and lie, he used to say he didn't want to be like the father, did not want to follow his profession, nor even engage in indoor work as the father did. He then began to plan to go away to lead a "wild, care-free life, away from all restraint." The man from whom he last took money was one whose son was also under strict authority—a fact which may be taken for what it is worth.

The possibility of there being a latent father antagonism was entirely overlooked at first, inasmuch as the father and son are at present the best of friends and "pals." They shoot and swim and go off on vacations together. Even the day after mental analysis had been fairly gone into, our patient showed me a letter to his father pleading for him to give him the right to go West at once, and ended with a playful threat that there were many ways to get money and a chance to go if the father should refuse.

*Results of Treatment.*—Associated with and following the foregoing analysis on the stealing and lying impulses, the youth was given ethical talks covering every phase of his previous misconducts and their consequences. Gradually an entire change in attitude and character took place. Now, several months after the analytic and training treatment, he has paid up all his old debts and has reimbursed his father for extra outlays in his behalf. He has voluntarily given up a desire to go West, has taken on a tutor and is working hard to enter a technical school from which his father was graduated, and is no longer unconcerned or careless in his daily conduct at home.

*Comment.*—In brief, then, we have here a boy who at the early age of 5 rather abruptly came into conflict with paternal discipline although the latter seemed to be not unnaturally or too severely administered. In sequence to this rebellion which was both suppressed and repressed, he developed a keen antagonism to the father and soon after began to lie and steal and assume other unethical traits of character. The habit of stealing continued until advanced adolescence, until corrective measures of training, away from the home environment, plus mental analysis were applied. The latter covered many interviews over a period of three months. At first, the boy met the analysis by an affectless indifference, but so soon as the real difficulty of defective adaptation to the father's authority as a child was made manifest and its later conscious contrast of seeming rapport with the father, the emotional reaction was intense. The analysis was never truly psycho-analytic but rather that of an intensive review of the foreconscious.

The investigation was, however, much more thorough and dynamic than that ordinarily given to such conduct disorders. Here, as in other instances, one is often impressed that the defective primary instinct acts as a sort of latent psychic infection which in time, as new adaptations in development are encountered, undergoes many transformations both in degree and kind. For example, the boy began with disobedience, then lying when hard pressed; next, he stole to get square with the father. Later, we find the school authority seemed to induce inattention to study and corresponding increase of desire to keep up and enlarge the chances for sport and play. The latter in turn necessitated more lying and deceit. Finally the previous defective adaptations engendered truancy and insubordination which passed over to vagabondage. Thus we see the mental conflict to correct the character faults was almost over. The don't care and affectless attitude of the incorrigible delinquent and final crystallization of the antisocial recidivist was about to be adopted when the correction was undertaken.

*Ancestral History.*—A word might be said regarding this boy's antecedents. The maternal grandfather left his family and led an antisocial life. The mother seemed inapt in handling children and rather slow in delicate appreciation of her duties and obligations in rearing them. Least of all did she understand wayward and headstrong boys. Her general attitude toward the inculcation of nursery ethics was poor and colorless. This son therefore easily found an early and warm attachment to his foster mother, the cook. The father left nothing wanting in his parental attitude toward the boy save an unusually lively temper and a quick and unsteady control over him, which seemed to make for the boy's ready belief that his father's talks were either bluffs of threatened punishment or that he was unjust in overawing the boy's attempts to set matters right in explanation. It may be of interest that the siblings of the boy himself were most normal physically and mentally and there was never the slightest moral difficulty with them. I may add at this point that there were no very serious sex delinquencies in this boy.

#### PRACTICAL CONSIDERATIONS

It may not be illogical to argue that from resistance to authority to theft, when found in the developing child, is not such a far cry when we look at the subject from the child, and not the adult, level. For instance, sufficient data are at hand for us to state that in the infant mind one of the earliest conceptions of reality is impingement of its desires by the parent. The magic signals of crying and gestures do not move the parent to gratify the child's wish. In the persistence of this feeling of unrequited longing, no doubt the child begins to scrutinize with continued wonder the reason for noncompliance on the part of the parent, and more or less rapidly interprets it in terms of selfishness or the self-satisfied possession of things and powers which enable that person to calmly resist all the child's frantic demands. Possibly it first sees that the very bigness of the parent lends strength. Soon, however, the personal belongings are also taken as symbols of the parent's potential self-sufficiency. One of the first acts of mimicry the growing child adopts is to deck himself out in the parent's wearing apparel. Thus equipped, it is the child's happiest concern to play the rôle of the parent, especially its authority vesture—tyrannical or beneficent whichever it may be. Balked by reality, the child's impulses are frequently gratified, perhaps secretly, in his play in the attic or barn. It is not a far step to the further exercising of power for the child's satisfaction in gratifying its personal appetite, in stealing fruits or committing forbidden excesses which he believes the parent has unrestrained opportunities to enjoy. If the child's lust for pleasure is sufficiently overmastering, this seizing of the parental power and privilege advances to new forms of covetousness and conquest, which may be that of possessing the magic symbol—money. It soon finds that money is really the easiest method of getting what it wants

rather than barter as in the manner of simple or primitive exchange. What is easier to imagine than that the unrestrained or poorly adjusted childish demand, perhaps repressed by the strict discipline of the parent, strives in some devious way to lay hold of the actual coveted possessions of the supposed favored one—the parent—who as he believes takes pleasure, or at least is indifferent, to the child's own ungratified longings.

#### CONCLUSION

In conclusion, I may say that even when the child's defective adaptation to authority and property right are made clear, there are probably other and still more genetic reasons for this early conflict, namely, the latent infantile desire to usurp the place of the father or the mother in all its possible prerogatives. One need not neglect the study of the adult life of criminals, and especially the causes for recidivism, for even there the adult pattern of the anti-social acts will probably be found to embrace in greater part the distorted mechanism of the primary instincts of early life. I but wish to add my suggestions to those hopefully made by Healy and Glueck, that the intensive study of antisocial behavior of the juvenile delinquent and especially in earliest childhood may enable us to correct not a few such faults before a fixed formation of habits and character has rendered the offender so hopeless for reconstruction in adult life.

## PERIPHERAL NERVE INJURIES

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### INTRODUCTION

Injury of peripheral nerves is the most frequent and important organic neurologic condition occurring as the result of war. These injuries have been carefully studied by the staff of American Red Cross Military Hospital No. 1, formerly the American Ambulance. The purpose of this paper is to place on record the methods used in caring for peripheral nerve cases in this institution and to report the results following nerve suture.

This hospital, founded Sept. 4, 1914, opened its doors with sixty beds devoted to the care of French wounded. This capacity was soon increased to 650 beds, and continued with this number until July, 1917, when the old American Ambulance was taken over by the United States government. Since then it has grown steadily to its present capacity of 2,000 beds. Even after it was militarized the vast majority of the patients were French, American wounded being in the minority. But this gradually changed until the ratio was reversed.

During the greater part of its existence the institution has been a base hospital, but as a result of the shifting of the Front it has at times served as an evacuation hospital. The neurologic work during these two phases of the hospital's existence essentially differed, as will be explained later. The work of the following neurologists contributed to the data incorporated in this report: Major H. O. Feiss, Major George E. Price, Capt. H. Unterberg, Capt. L. Grimberg, Capt. E. M. Connely; Lieut. A. H. Williamson and Lieut. William B. Terhune. Most of the operative work was done by Col. James P. Hutchinson, the remainder by Capt. P. M. Keating and Capt. T. Mullen.

### GENERAL PROCEDURE

The neurologic work was conducted as follows: The wounded, when evacuated directly from the Front, without previous surgical

intervention, were examined in the Receiving Ward by a member of the neurologic staff before being sent to the operating room. This examination was necessarily hurried and therefore incomplete. Only a few moments were required with each patient to determine the presence of a nerve lesion. Sensory involvement of the musculospiral, median and ulnar nerves was determined by touching three points, namely, the first dorsal interosseous space, the palmar surface of the last phalanx of the forefinger and the little finger. Touching the dorsum and sole of the foot gave the same information for the two branches of the sciatic nerve. A few movements, such as closing the hand, spreading the fingers, extending the wrist, flexing and extending the foot and toes, gave an approximate idea of the conductivity through the motor fibers of the principal nerves of the two extremities.

When a nerve injury was discovered, a large colored card, indicating the nature of injury, was attached to the patient's papers and accompanied him to the operating room. This practice received favorable comment from the surgeons, and resulted in a decided increase in the number of primary nerve sutures. Subsequently, all patients were systematically examined in the wards by a neurologist, and a typewritten report of the neurologic findings included with their papers. A note was also made on the patient's Field Medical Card. It was the duty of the neurologic staff to make repeated examinations on these patients and to recommend nerve operations when indicated.

During the operation a neurologist was present, at times acting as assistant. He tested the exposed nerve for faradic excitability, gave his advice when requested, and afterwards made notes on the findings and surgical procedure. Following operation the patients were re-examined at intervals and notes of their condition made.

The French patients, owing to an admirable system of auxiliary convalescent hospitals, were retained until ready for nerve suture, following which operation they were kept under observation during convalescence. On leaving the hospital they were requested to report at intervals for examination. When they failed to do so detailed questionnaires were sent them, with the request that they take the questionnaires to the nearest military surgeon, or, none being available, to answer the questions themselves. On many of these individuals operations were performed over two years ago, so the opportunity for determining end-results has been excellent.

Previous to nerve suture, preliminary treatment was inaugurated. This consisted chiefly in massage and passive movements, proper apparatus being used to prevent overstretching of paralyzed muscles.



In the majority of cases secondary closure of the wound, followed by excision of the scar, preceded operation on the nerve, and was considered an important preliminary surgical procedure. After suturing the nerve, massage, electricity and passive movements were instituted as early as possible. To have patients engage in a suitable form of work is an important factor in the after-treatment, as many of them have related the first evidence of returning function in a sutured nerve to the volitional effort to use the affected extremity.

#### THE EXAMINATION AND RECORDING OF CASES

With the beginning of the year 1916, a definite routine of examination was introduced with the object of giving records the accuracy and clearness necessary to make them reliable. After many modifications a satisfactory plan was finally evolved from which no important changes have been made for about two years. Following is the formula used:

##### PERIPHERAL NERVES

Name	Age	Number	Rank	Organization	Location in Hospital
Home address.....					

##### HISTORY

*Diagnosis:* From papers accompanying patient. (Including date of wound and nature of projectile.)

*Treatment Previous to Admission:* Operation.

*Date of Admission:*

*Information from Patient:* What happened when injured; posture of body at time of injury. History of spasmodic contracture, paralysis, sensory disturbance, hemorrhage. Progress of condition since injury: improved, no change or worse; pain, nature of.

##### EXAMINATION

Date..... Part examined.....

*Wounds:* Location, extent, condition. Caused by original projectile or due to operation.

*Deformities:* (Position of joints.)

*Bones:* Fracture, callous formation, loss of substance, stage of union, local deformity, shortening or lengthening.

*Circulatory, Vasomotor and Trophic Changes:*

*Atrophy:* By inspection and measurement of limbs of both sides, at standard levels, with joints in standard positions.

*Sensation:* Record in writing and by diagram.

*Motions:* Estimate range and power of movement in standard directions with and without resistance. Compare with normal.

*Reflexes:* Deep and periosteal. Upper limb: Radiostyloid and olecranon. Lower limb: Knee jerk and ankle jerk.

*Excitability:* Compare with normal side. Mechanical. Electrical (faradic and galvanic).

*Diagnosis. Prognosis. Recommendations:*

#### SUPPLEMENTARY NOTES

*Operation:* Date, procedure and findings. Electrical reaction.

*Progress of Condition:*

Date..... Signature of Neurologist,

In presenting this formula the significance of certain terms used, as well as their relative importance, may be briefly explained. As regards the "History" the subheadings explain themselves, but it may be pointed out, as applying to this or any other kind of history, that a simple and straightforward method of obtaining "Information from patient" is first to have him tell his own story and then to elicit further data by asking leading questions, such as pertain more specifically to the kind of case which is being studied. The list of important manifestations given in the formula will help to suggest the questions required.

Coming to the "Examination" itself, too much stress can never be laid on the importance of mentioning the date of examination in every case and of stating what part is being studied, as the omission of either of these elementary points might render the rest of the record completely worthless. The first heading, "Wounds," derives its importance first from the accurate description of their location, as indicating the probable level of the nerve injury, and secondly, from noting the stage of healing, the complete closure of the external wound being a necessary condition for surgical intervention. The term "Deformity" refers to habitual position of a joint, owing to a lack of subjective control. The fixation may be of any degree. For purposes of record it is necessary to estimate the angle formed by the parts at the joint.

Under "Circulatory, Vasomotor and Trophic Changes," it is very important to study every manifestation of the effect of the nerve lesion on the circulation, including the temperature and the color of the part, the dryness or moisture of the skin, the speed of return blood-flow as seen with pressure on the thumb nail and whether there is a tendency to sloughs. It is important to bear in mind that between the circulation and nervous system there is a reciprocal influence brought to

bear through the vasomotor system, and where there is a nerve lesion this influence gives rise to a vicious circle by which the effects on the nerve endings and vessels seriously damages the nutrition of the muscles. This condition in turn exerts a retarding influence on the proclivity of nerve fibers to regenerate, due to the poor nutrition of the end-organs.

The heading "Atrophy" entails the study of the special regions affected as a result of the nerve lesion, as well as the atrophy due to disuse, and that resulting from the pressure of bandages and splints. Atrophy is determined by making comparative measurements of the limbs of the two sides, at standard levels.

"Sensibility": There is no limit to the amount of time and effort that may be consumed if every phase of this class of manifestations is to be exhausted. For practical purposes it is sufficient to investigate the two phases that are easiest both for the patient and examiner to interpret; namely, the sense of touch and pain. The condition found is best indicated in the record by a shaded diagram.

Tinel's sign, as evidence of nerve regeneration, was looked for in the course of the examination. The value of this sign is doubtful.

With regard to "Motions," it is important that this term should have a definite and unequivocal connotation, and it is suggested that it be used to pertain to the range and power of movement, with reference always, to given joints. Comparison with the normal is to be made, testing the motion of each joint in standard directions, both with and without resistance. Where it is feasible, the power of individual muscles and groups of muscles should be estimated. The study of "active" and "passive" motion is, as a rule, not required, as a knowledge of the "power" and "range" of a motion includes that of "active" and "passive" control and has a broader meaning.

"Excitability" is of two kinds, mechanical and electrical, the latter being tested with both the faradic and galvanic currents. In the case of mechanical excitability, a reflex hammer is used, and the response of the muscular mass tapped is noted, chiefly for sluggishness. In the use of the faradic current one looks for response in both nerve and muscle, noting whether it is strong or weak. The most important information ascertained by the use of the galvanic current is whether or not the response of the muscle tested is normal or delayed in time.

#### MATERIAL

There are available for statistical purposes 857 histories of peripheral nerve injuries, with the records of 205 reparative nerve operations, 151 of these having been followed during convalescence for at least six months after operation.

The relative frequency of different nerve lesions was as follows:

Cervical sympathetic .....	3	
Total sympathetic lesions.....	—	3
Optic nerve .....	1	
Oculomotor nerve .....	2	
Facial nerve .....	16	
Vagus nerve .....	1	
Spinal accessory nerve.....	2	
Hypoglossal nerve .....	1	
Total cranial nerve lesions.....	—	23
Brachial plexus, complete.....	5	
Brachial plexus, partial.....	51	
Brachial and cervical plexuses.....	2	
Brachial plexus and cervical sympathetic.....	2	
Total brachial plexus lesions.....	—	60
Circumflex .....	11	
Musculospiral .....	198	
Median .....	55	
Ulnar .....	150	
Musculocutaneous .....	1	
Two nerves involved, upper extremity.....	95	
Three nerves involved upper extremity.....	41	
Four nerves involved upper extremity.....	4	
Total nerve lesions of upper extremity.....	—	555
Lumbosacral plexus .....	1	
Sciatic .....	116	
Internal popliteal .....	19	
External popliteal .....	61	
Anterior crural .....	14	
External cutaneous .....	1	
Two nerves involved lower extremity.....	4	
Total nerve lesions of lower extremity.....	—	216
Total nerve lesions.....		857

These figures show that the musculospiral nerve is the most frequently injured, the ulnar nearly as often, the sciatic is next, and the external popliteal, which is fourth in the order of frequency, is involved more than twice as often as is the internal popliteal.

The two nerves of the upper extremity most frequently involved together were the median and ulnar, the musculospiral and ulnar being next. When three nerves were involved the median, ulnar and musculospiral combination was by far the most frequent. These findings agree with what would be expected when the anatomy of the upper extremity is considered.

Fractures are frequently associated with peripheral nerve injuries. This occurred in 73 per cent. of the musculospiral cases, 57 per cent. of the ulnar lesions, 48 per cent. of the median injuries, 37 per cent.

of the external popliteal involvements, 25 per cent. of the brachial plexus cases, 19 per cent. of the sciatic and 15 per cent. of the internal popliteal lesions. Wounds complicated by fracture are naturally more severe than those not so complicated. It is also true that when a fracture is present a longer interval elapses between the date of injury and nerve operation. The records of this hospital show no larger percentage of recoveries in patients without fractures than those with such a complication, other factors being equal.

#### RESULTS

Comparison of the published reports of the results from nerve suture reveals a marked discrepancy in the success attained by various operators. While differences in technic, operative skill, and the time of operation play no small part in the results following nerve repair, the inconsistency in the reports may in part be due to the difficulty in interpreting the changes occurring after operation. It is necessary that a simple and logical standard of interpretation be accepted. The classification employed by Gosset meets such requirements and has therefore been followed in compiling these statistics. Having eliminated all patients who were lost sight of, or who were operated on less than six months previously, the results following operations have been classified as unimproved, amelioration, marked amelioration, and recovery.

A case was considered ameliorated only when there was definite evidence of nerve regeneration as proved by return of sensation, of the ability to make certain movements, by the reappearance of faradic excitability or the disappearance of trophic lesions. Those classified as marked amelioration show almost a complete return of voluntary movement, yet not sufficiently improved to be considered as absolute recoveries. A case was interpreted as recovered only when all voluntary movements had returned; that is, insofar as range of motion was concerned, although strength might not as yet have completely returned. Every effort has been made to eliminate movements effected by the uninvolved muscles. This has been done by adopting the criteria suggested by Pitrie, Claude, Froment and Gosset. It should be emphasized that if any error exists in the interpretation of the operative results of this hospital, it lies on the side of conservatism, for no doubtful results have been recorded. There is reason to believe that many cases now classified other than recoveries will as time passes show great improvement. Six months is too short an interval to judge results following nerve repair. Some such interval of time is necessary, however, as a working basis for a preliminary report.



The accompanying table is a summary of the results attained in this hospital following late operations on peripheral nerves.

#### OPERATIVE RESULTS

Diagnosis	Total Number of Cases	Recoveries	Marked Amelioration	Amelioration	Unimproved
Musculospiral.....	44	6	11	12	15
Median.....	16	1	6	7	2
Ulnar.....	32	1	7	13	11
Median and ulnar.....	10	1	1	6	2
Median and musculospiral.....	1	—	—	1	—
Median and musculo-cutaneous..	1	—	1	—	—
Ulnar and musculospiral.....	1	—	—	—	1
Brachial plexus.....	1	—	—	—	1
Sciatic and branches.....	33	6	8	10	9
Fusions and anastomoses.....	12	—	—	1	11
Total.....	151	15	34	50	52

Excluding the nerve anastomoses and fusions, which in all cases were absolute failures, over 10 per cent. of the cases in which operation was performed resulted in recoveries; over 24 per cent. were markedly ameliorated, making a total of 35 per cent. greatly benefited. Thirty-five per cent. showed amelioration, this improvement having been sufficient in the majority of these cases to justify the operation. Twenty-nine per cent. are up to the present time failures.

With a limited number of operations it is difficult to say which nerves regenerate best. Certainly the musculospiral and the sciatic showed a higher percentage of recoveries; the results in the sciatic, although more delayed in appearance, were equally as good as in the musculospiral. Recoveries were rare following median and ulnar lesions, although marked ameliorations and ameliorations were frequent. It will be noticed that where two nerve lesions existed in the same wound very little success followed nerve suture, this in part being due to the greater destruction of tissue and interference with the blood supply in such wounds. It is the opinion of the neurologic department that nerve fusions and anastomoses are not, as a rule, justified. Such operations are successful in physiologic experiments on lower animals, but in late operations following injuries in war the procedure in our experience has not been of value.

In the operating room a nerve is often found tightly encased in scar tissue, the nerve itself showing indications of injury. The neurologist should decide whether simple liberation or excision and suture is the operation of choice. In reviewing these statistics it was found that 20 per cent. of the nerves liberated recovered, 23 per cent. were markedly ameliorated, 22 per cent. ameliorated, and 35 per cent. unimproved. Only 6 per cent. of the sutured nerves completely recovered, 24 per cent. showed marked amelioration, 40 per cent. amelioration, and 30 per cent. unimproved. The rule practiced here is, that



having utilized all recognized methods to determine which is the operation of choice, if doubt still exists it is best to excise the scar and suture the nerve.

In all discussions of nerve reparation there must be taken into account the interval of time elapsing between the date of injury and that of operation on the nerve. It is an established fact that the sooner the nerve is repaired after injury the better the result will be. This was well illustrated by the musculospiral cases; for the recoveries this interval averaged two and one-half months; for the marked ameliorations five months, for the ameliorations seven months, and for the unimproved eight months. The sciatic recoveries show an interval of two and one half months, the marked ameliorations and the ameliorations four months, and the unimproved five and one half months.

Owing to the fact that this institution has been a base hospital throughout most of its existence, primary suture of the injured nerve at the time of the first operation on the wound has not been possible in a large number of cases. However, for a short time this was an evacuation hospital and nerve sutures were performed at the time of the primary operation on the wound. These operations have been too recently performed to permit the compilation of reliable statistics. But one fact is most evident: the results of such operations have been extraordinarily good; far better than those following late operation. These results prove beyond any shadow of doubt that any surgeon who fails to repair an injured nerve at the time of the original operation, regardless of the condition of the wound, commits a very grave error of judgment. Even though in some cases the primary suture of the nerve may be a failure, it simplifies the operative technic in later operation, reduces the amount of scar tissue between the nerve ends, gives more nerve tissue for the future operation and insures a better blood and lymph supply for the nerve when it is finally restored to continuity. The opinion of the neurologic department of this hospital has not been based solely on their experience while the institution was an evacuation hospital, but also on the excellent results seen in patients whose nerves were repaired at the front and later were evacuated to this base.

#### REPORT OF CASES

A few case histories which may prove of interest have been picked from the records, some with the hope of emphasizing certain important points, others with the view of reporting conditions infrequently described.

The following is the report of the suture of a musculospiral nerve at the front two hours after the patient was wounded, and being one of several similar records, bears out the contention that when the nerve is repaired at the time the wound is debrided, recovery is often rapid.

CASE 1.—No. 10387. *History*.—Wounded Aug. 27, 1917, at Jouvenceaux by *cclat d'obus* (shell explosion). Admitted Sept. 11, 1917.

*Diagnosis*.—Wound in right arm. Paralysis of right musculospiral nerve.

*Operation*.—Suture of musculospiral nerve performed by a French physician at the front, two hours after patient was wounded.

*Examination*.—Right upper limb: A long linear operative scar in arm over the course of the musculospiral nerve.

Deformity: The hand tends to drop; otherwise negative.

Atrophy: Wasting marked on the extensor surface of the forearm.

Circulation: Hand cold, good radial pulse, part normal in color.

Motion: Shoulder: normal. Elbow: normal. Wrist: Patient is able to extend his hand well beyond the plane of the forearm to within 5 degrees of normal range; normal flexion; good ulnar flexion; no radial flexion. Fingers: Patient is still unable completely to close his fingers, but has very good flexion; normal extension; abduction is three quarters of normal. Thumb: Good flexion, poor extension; fair abduction, fair adduction.

Sensation: Hypoesthesia over distribution of radial nerve.

Excitability: No reaction in the musculospiral system to either current.

*Diagnosis*.—Old musculospiral palsy.

*Conclusion*.—With the exception of the extension of the thumb, this patient has recovered function. The case may be classified as one of great amelioration.

Note: Patient first noticed return of function a month ago (April, 1918). Further improvement might be expected.

Oct. 4, 1918.—The patient reports improvement in motor function beginning about last May (eight months after operation), manifesting the changes for the better little by little for some weeks and then ceasing to improve much, except for the power of extension, which he has developed in thumb joints.

*Examination*.—Sensibility: Slight improvement as regards intensity, area of hypoesthesia being about the same size it was at previous examination. Shows power in all muscles of musculospiral system, including those for thumb, which he can extend at all joints and abduct as a whole. These motions as well as other motions executed by musculospiral muscles still lack complete power (perhaps being now two thirds normal) and the range is limited a little actively (not passively). For practical purposes it may be classified as recovery.

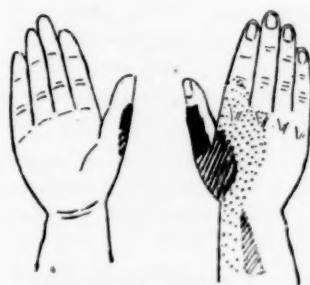
The next report is unique. One month after the musculospiral nerve had been cut and sutured there was definite evidence of return in protopathic sensation. The patient was an officer of distinction who had been carefully examined by numerous neurologists, both before and after operation, all of whom agree in regard to the sensory

improvement described. No similar case exists in the records of this hospital, although Purves Stewart claims that protopathic sensation may commence to return three weeks after secondary nerve suture.

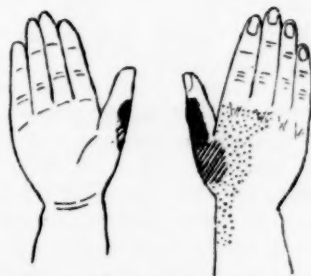
CASE 2.—Captain X. *History.*—Wounded March 11, 1918, by shell fragments, in left arm about middle third; compound, comminuted fracture of humerus.

*Examination.*—Left upper limb, July 4, 1918.

Deformity: Wrist-drop.



BEFORE OPERATION.



ONE MONTH AFTER OPERATION.

[Solid black] ANAESTHESIA.  
 [Stippled] MARKED HYPAESTHESIA.  
 [Dotted] SLIGHT HYPAESTHESIA.

Diagram showing sensory changes in Case 2, Captain X.

**Atrophy:** Considerable wasting of the muscles on the extensor surface of the forearm.

**Motion:** Elbow: Strong flexion to right angle; strong extension to within 10 degrees of normal. Further movements in flexion and extension are limited mechanically. Pronation normal; supination can only bring the hand to the vertical position. Wrist: No extension; flexion one half of normal; limited mechanically; slight lateral movements; passive extension normal in range. Fingers: Can extend at interphalangeal joints but not at metacarpophalangeal joints; good flexion at interphalangeal joints, but only one half of normal range at metacarpophalangeal joints, being limited mechanically. Thumb: Good flexion, abduction, adduction and opposition; no extension except of terminal phalanx.

Sensation: Compare accompanying diagram.

Excitability: Faradic current: no response of muscles of musculospiral system in forearm. Galvanic current: muscles of musculospiral system react normally.

*Operative Notes.*—July 5, 1918. Incision made uncovering musculospiral nerve. Nerve found 2 inches above elbow and followed up into groove of humerus; about  $3\frac{1}{2}$  inches above the elbow the nerve was found to be flattened, edematous and of a grayish color. The nerve was then followed to where it was caught in the bone. The upper end of the nerve was followed down to a point approximately opposite the lower portion to which it may have been joined by a very small band of fibrous tissue, the two ends were separated by scar tissue and callous half an inch thick. Both ends of the nerve were then cut until signs of nerve fibers were found. The nerve was sutured by five mattress sutures of fine silk. The operation required three hours and fifteen minutes.

*Reexamination.*—Aug. 6, 1918. No motion in extensors in forearm supplied by musculospiral nerve. Pinching the radial nerve or tapping over it in the upper part of the forearm caused an electrical sensation in the radial distribution over the thumb.

*Conclusion.*—The comparison of the two diagrams shows sensory improvement. This is a favorable sign and further improvement may be expected.

The following is a summary of the history of a case in which there was no apparent result for nearly two years after operation; then there was almost complete recovery:

CASE 3.—No. 41. Private P. J. was wounded in the right arm Oct. 16, 1915, by a bullet, which fractured the humerus and injured the musculospiral nerve. An operation was performed May 24, 1916. The nerve was found severed, both ends terminating in bone callous at the site of the fracture. The nerve ends were liberated, the injured portions of the nerve excised and the nerve sutured.

No return of function was noted until May, 1918. When last examined, Aug. 31, 1918, the patient was able to extend wrist and hand a few degrees beyond the plane of the forearm. He could extend fingers to the level of the hand. Could extend terminal and second phalanx of thumb. He could not abduct thumb. Sensation had entirely returned except for slight blunting over dorsal surface of thumb. The case was classified as marked amelioration.

The last case to be described is of interest because the operation was performed to relieve pain. This has not been necessary in many cases. In fact, exceedingly painful nerve lesions have not been as frequently encountered as the published reports might lead one to expect. When causalgia does exist, however, there is a reason for it, such conditions as pockets of pus or hematomas having been found to be the cause, as well as definite injury to the nerve.

CASE 4.—No. 8463. Private A. K. had been subject to two reamputations below the knee because of a "painful stump" following a primary amputation of the foot. A third reamputation above the knee had been advised because

of a continuation of the pain, associated with spasms of the muscles of the stump, which prevented his wearing an artificial leg.

A band of hyperesthesia was found on the stump corresponding to the cutaneous distribution of the sciatic nerve. Pressure over the sciatic nerve in the thigh caused severe pain and spasms of the muscles. Pressure over the anterior crural nerve gave no pain.

Further examination revealed two small scars, one on the outer and the other on the inner surface of the thigh, the result of a through and through wound caused by a machine gun bullet. The location of these scars showed that the bullet must have passed near the sciatic nerve.

The sciatic nerve was explored in the neighborhood of these scars and was found hard, thickened and encased in scar tissue. The nerve was liberated and a neuromatous mass involving two thirds of the diameter of the nerve was excised, the cut surfaces of the nerve were approximated and sutured.

Following operation pain and spasm disappeared and the man is now able to walk with the aid of an artificial leg, the operation having preserved a useful knee joint.

#### CONCLUSIONS

As the result of considerable experience with peripheral nerve work certain facts have been found worthy of emphasis, some of which have been noted by other observers.

1. The musculospiral is the nerve most frequently injured in war; the ulnar nerve is involved nearly as often.
2. Following operation the musculospiral and sciatic nerves make the best recoveries, the results in the case of the sciatic being equally as good as these of the musculospiral.
3. The condition of an injured nerve when examined by sight and touch at the time of operation, is invariably worse than the previous clinical findings would lead one to expect.
4. When at the time of operation, having utilized all the methods to determine whether simple liberation or excision and suture is the best procedure, if doubt still exists, excise and suture.
5. Repair of an injured nerve as early as possible should be the aim of every surgeon. For this reason in time of war neurologists should be stationed close to the Front, in order that the wounded may be examined for nerve lesions before going to the operating room. This, by increasing the number of primary nerve sutures, will unquestionably lead to a higher percentage of recoveries.
6. Patients convalescing from nerve reparation should be encouraged to use the extremity affected, for volitional effort plays a part in the return of function.
7. The more respect the surgeon shows nerve tissue when repairing an injury the better will be his results. The nerve should be stripped and handled as little as possible and the ends should be so approximated as to place in apposition corresponding fasciculi of the cut nerve.



## AN UNUSUAL CASE OF VAGOTONIA

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It is unnecessary at this time to review the conception of vagotonia and sympatheticotonia. It is only desired to place on record an extreme and, in many respects, unusual case of vagotonia, under observation at the Navy Base Hospital at Mare Island. An exact all-inclusive definition of vagotonia cannot be given, as no case embraces all of the features known to occur in this condition and innumerable borderline syndromes are seen which may reasonably be classed as of vagotonic origin, but which are more or less obscure and even contradictory. Some symptoms undoubtedly associated with the condition are difficult to explain, and it is more than likely that our conception of vagotonia will change materially with fuller knowledge of the physiology of the autonomic nervous system. The essential etiology of vagotonic syndromes is poorly understood at best and in the case here reported, was not elicited.

According to Eppinger and Hess, vagotonia is characterized by a hypersensibility to pilocarpin with a relative insusceptibility to sympathetic stimulation. Various clinical indications of heightened tonus of the vagus system are present. These may include a varying number from a long list of symptoms, such as gastrospasm, or spasm of any part of the alimentary canal, bronchial asthma, eosinophilia, biliary colic of nervous origin, spastic constipation, hyperacidity, bradycardia, cold, moist hands and feet, small pupils, sinus arrhythmia, increased frequency of urination, etc. In the case here reported many characteristic symptoms were present to a marked degree. No case presents all of them and sometimes none are very distinct.

### REPORT OF CASE

*History.*—C. B. J., an American sailor, was born Dec. 29, 1891. He was a native of Arkansas and has always lived in Arkansas, Oklahoma and Texas until enlistment in the Navy some four months ago. He has had pertussis, mumps, measles and varicella, no scarlatina or diphtheria. Until the age of 15 he lived in Arkansas and was subject constantly to malaria. Has had no malaria since the age of 17. His mother died of tuberculosis when the patient was 8 years old. His father, three sisters and one brother are living and well. The patient is 27 years old, married, has four healthy children, ranging in age from 10 months to 6 years. His wife has had no miscarriage. The patient never had pneumonia, typhoid, or articular rheumatism. Eight years ago he had "grippe" and again in the present epidemic. He has had much trouble with his tonsils, and excessive pyorrhea. He has lost two incisors.

Has no tendency to colds or bronchitis. Has no cough nor pain in chest. Height is 70 inches. Weight 170 pounds. Ruddy complexion. Enlisted July 17, 1918. He has never had symptoms of circulatory trouble, although he has fainted twice in his life, both times from a very hot bath. For the last ten years he has been very constipated but had no indigestion other than that associated with present illness. By occupation he is a farmer. He has been twice infected by the gonococcus, the last infection four years ago was cured with no sequelae. He had chancroid two years ago, three soft sores without bubo. For this he was given four arsphenamin injections with no effect on the sores which were finally cured with aristol. He has never had a rash or skin eruption except that associated with present illness.

*Present Illness.*—This began in the spring six years ago, as a swelling of the insteps, which was painless and lasted for two months and did not progress further. That fall he began to have five to six day periods of general swelling, apparently an anasarca, with a few normal days in between the periods. The length of the periods of swelling gradually increased to about six weeks each with intervals of about four weeks. After a time the swelling involved also the arms and eyes. This condition lasted for a year. The following spring he suffered from "dumb chills," loss of appetite and weight, and the condition was diagnosed as "grippe." With this he had considerable cough and nausea. He was in bed for a month and was given so much calomel that he has been constipated ever since. Following this acute illness the periods of swelling became worse and he would swell all over to such an extent as to gain as much as 21 pounds in a few days. This situation lasted nearly a year. In all, he had seven attacks of general edema at intervals for three years. These attacks were always accompanied by severe generalized giant urticaria which the patient described as "bull hives." Between attacks he would be entirely well. For the last two or three years the attacks have been milder and the free periods longer, sometimes as much as five months intervening between them. Sometimes his tonsils would swell greatly, but he has never had edema of the glottis and his voice never became husky. With the attacks he always has considerable digestive disturbance, which usually was relieved by milk diet and fruit, with enemas for the constipation which was worse at these times. With the indigestion he suffers from cramp-like pain especially across the upper abdomen.

The present acute attack came on without obvious warning. He was enlisted with perfect physical examination, his statement that he "sometimes swelled up" being ignored. The present attack began with shooting pains, not very severe, over the trunk. Hives were very troublesome and the wheals very large and evanescent. He felt weak and dizzy, but with no stomach trouble at first. He became very short of breath and complained much of the itching of the skin and of generalized tingling. He had no cardiac palpitation, but felt as if his feet were constantly going to sleep. He says that in previous spells, as now, he has had much "rheumatic pain" of indefinite and changing distribution but never articular. The patient was sent to a base hospital from another station with the diagnosis of spleno-myelogenous leukemia. This was based chiefly on a leukocyte count of 30,000 with a large, hard spleen.

*Examination.*—He had no palpable glands in the axilla, neck, epitrochlear or inguinal regions. The heart was normal and normal in function; no murmur and no change after vigorous exercise. Lungs negative. The abdomen shows slight tenderness deep in the epigastrium and in the right iliac fossa on deep palpation. The spleen was easily felt but not below the costal margin even on

deep inspiration. Its consistency was rather hard. No other organs or masses were felt. Fluoroscopic examination of the chest showed the heart, lungs and great vessels to be normal. The blood pressure was 120/72 (Mercer); six hours later it was 110/70. There was definite generalized edema, which was more marked around the ankles and feet. The urine was entirely normal. The coagulation time of the blood was eight and one-half minutes, the same as two normal controls. Temperature, pulse and respiration were normal. He feels well now, except for itching.

*Subsequent Examinations.*—One week later: Temperature was 99.2 F. yesterday (compare blood count table). No evidences of malaria could be found on repeated examinations. The sputum showed on culture and smear a few pneumococci and a few eosinophils. The Wassermann test was negative twice. Coagulation time normal. Arneth index 42 (6 16 40 36 8). Eosinophils 37 per cent.

Two weeks later: He has been swelling more and the urine has become proportionately lessened in quantity. There were a few patches of itching wheals on the palms as well as a mild generalized urticaria. Repeated examinations of blood at all hours of day and night show no filaria. There were no ova or parasites in the stools on daily examinations, with and without a cathartic, and with the best concentration methods. The roentgenogram of the chest was entirely normal. The roentgenogram of the gastro-intestinal tract showed the lower border of stomach 1 inch below the umbilicus; it was regular in outline. The duodenum was normal; the stomach emptied in six hours. In short the gastro-intestinal tract was entirely normal. The quantity of urine today was 635 c.c.; specific gravity, 1.032; acid; no albumin or sugar; urea, 14.1 gm.; total nitrogen, 15.65 gm.; ammonia, 0.392 gm. Repeated routine examinations were entirely normal except for evidence of some concentration during the edema. The edema is diffuse and general. At times he has abdominal, colicky pains and occasionally a little diarrhea.

TABLE OF THE BLOOD FINDINGS DURING A CHARACTERISTIC ATTACK

Date	Hemoglobin	Red Blood Cells	Eosinophils	Poly-morpho-nuclears	Lymphocytes	Trans-itionals	Mononuclears	White Blood Cells	Remarks
9/19/18	80	4,450,000	0	64	36	0	0	7,000	
9/20/18	90	4,700,000	0	70	29	1	0	7,000	
9/23/18	90	4,290,000	0	68	31	1	0	7,000	
9/24/18	..	.....	33	37	25	0	5	8,000	Hives and pain
9/25/18	80	5,100,000	26	40	32	2	3	9,000	
9/27/18	..	.....	21	51	27	0	1	7,000	Edema
10/1/18	..	.....	33	40	24	0	3	7,600	
10/13/18	..	.....	29	60	10	0	1	61,100	Full attack
10/14/18	90	4,710,000	49	39	12	0	0	52,300	
10/15/18	90	4,650,000	67	22	11	0	0	52,400	
10/16/18	90	4,500,000	76	19	4	1	0	60,500	Edema less
10/17/18	..	.....	75	15	10	0	0	57,700	Edema less
10/18/18	..	.....	70	13	15	0	1	37,400	
10/19/18	..	.....	78	11	11	0	0	24,600	Attack about over
10/20/18	..	.....	64	14	18	2	2	20,900	
10/21/18	..	.....	55	23	20	1	1	17,000	
10/22/18	..	.....	51	25	22	2	0	12,800	
10/23/18	..	.....	52	28	18	0	2	9,100	
10/24/18	..	.....	49	24	26	0	1	8,100	
10/25/18	..	.....	33	26	33	2	2	10,300	Four mast cells
10/27/18	..	.....	35	25	37	0	1	7,000	Two mast cells

From the abnormal condition as shown in the accompanying table the differential count would gradually return to normal.

Two months later: The previous attack had entirely disappeared in the course of a month. He is beginning to have another milder attack of the same nature. The skin reactions to sixty-five proteins, and an assorted group of keratinoids, including horse dander, chicken and goose feathers, dog hair, horse hair, and also horse serum, are entirely negative. A portion of muscle was excised from the tendinous extremity of the deltoid insertion but showed no trichina. The teeth were put in good order. The tonsils gave no indication for removal. Adrenalin, 0.001 gm., gave no local reaction or general reaction except a rise of blood pressure of some 6 mm. Gastric analysis after a test meal, during height of attack, gave a moderate hyperacidity.

#### DIAGNOSIS

The diagnosis of leukemia made on admission was rejected because of the total absence of data supporting it. The large spleen seemed evidently due to the old malaria and did not increase in the three months the patient was under observation. There was no gland enlargement. The diagnosis of vagotonia rested on the presence of the various characteristic symptoms already detailed as well as on the absence of any other discoverable cause for the condition, especially the eosinophilia. It is to be regretted that the sudden onset of the influenza epidemic made it impossible to study the metabolism and drug reactions of this case further.

350 Post Street.

# CONTRACTURE OCCURRING IN PARTIAL RECOVERY FROM PARALYSIS OF THE FACIAL NERVE AND OTHER NERVES \*

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PHILADELPHIA

The occurrence of contracture in incomplete recovery from facial paralysis is well known, but so far as the writer is aware a satisfactory explanation of this contracture has not been offered. Gowers states that the cause of the late over-action and spasm is probably a change in the functional state of the cells of the nucleus of the nerve, produced by their altered functional condition during the complete paralysis — but, once established, permanent. Oppenheim likewise attributes the late manifestations of facial paralysis to irritation of the facial nucleus.

The most satisfactory explanation of the late facial spasmodic tic and of the late associated movements in the facial supply on the paralyzed side is to be found, in the opinion of the writer, in the abnormal condition which occurs in regeneration of the facial nerve. Such phenomena are never seen when the paralysis remains complete nor when recovery is complete; they develop only with partial recovery of the muscles of the facial nerve supply. The tic movement about the mouth, as the writer has frequently determined, is always synchronous with the winking of the eyelid, and is clearly an associated movement. When regeneration occurs and young axis cylinders grow out from the central trunk, some of these intended for the upper branch lose their way and grow into the lower branch, while others intended for the lower branch find their way into the upper branch; thus the cells of the facial nucleus originally intended for the innervation of only one branch of the nerve are brought into control of both branches, and no movement occurs alone in one branch. The person in such a condition draws up the corner of the mouth every time he closes the eye, or he partially closes the eye on the same side every time he draws up the corner of the mouth, so that the facial tic in the muscles about the mouth is nothing more than an associated movement. The writer does not claim originality for this part of the explanation, but so far as he is aware no one has explained satisfactorily the permanent muscular contracture. To him it seems reason-

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\* Read before the Philadelphia Neurological Society, November, 1918.



able to seek the cause of this contracture in overstimulation of the affected muscles. Every time the eyelids are closed the corner of the mouth on the affected side is drawn up, and the muscles of this part receive a stimulation to this extent greater than occurs in a normal person. Likewise, every time the mouth is moved, as in chewing and speaking, the muscles innervated by the upper branch are stimulated and the lids on the affected side are partially closed, thus the orbicularis palpebrarum is stimulated frequently in addition to that caused by normal winking. The muscles on the affected side, as a result of this excessive stimulation, are kept in a state of hypertonicity, and complete relaxation is not obtained, or is obtained for much shorter periods than in normal persons; the affected muscles kept in a more contracted state gradually shorten and in this way the late contracture is produced.

In cases in which the paralysis has developed very early in life and the regeneration has been more nearly confined to the normal distribution of nerve fibers, so that the regeneration of fibers of one branch has not led to a wandering out of fibers into abnormal pathways, except to a very limited extent, associated movements and tic movements may not occur except in a very limited degree. The writer has recently observed a partial recovery in a child of about 10 years of age in whom the facial paralysis developed at the age of 1 year and 3 months. Here there was no contracture, and apparently, at first sight, no associated movement, but more careful observation showed that forcible closure of the eyelids produced fine fibrillary tremors about the mouth on the affected side, such as occur in muscles whose nerve cells in the central nervous system are undergoing rapid degeneration. The fibrillary tremors were a form of associated movement, and occurred because very few fibers destined for the upper branch of the facial nerve had wandered into the lower branch during the regeneration, and the stimulation occurred in only a few muscle fibers of the lower supply.

This explanation, depending on the presence of aberrant nerve fibers in a nerve undergoing regeneration, may be employed also for the contracture which results in various parts of the body after an injury with partial regeneration of the nerve supply of the muscles in which the contracture occurs.

It probably will be found that such contracture occurs with partial recovery of motor power following a nerve lesion rather than with persistent complete paralysis or almost complete recovery. Where every muscle in a nerve distribution is stimulated on attempted innervation of a few muscles of the same distribution, as for example, the contraction of almost the entire muscular supply of the ulnar or

median nerve which may occur from attempted isolated movement of a finger in incomplete recovery of the nerve, the result would be overstimulation of the entire group of muscles.

There are other causes of contracture, among which faulty position plays an important rôle.

If this explanation of overstimulation of muscles for certain forms of contracture is accepted, caution against producing contracture by electrical stimulation as is given especially in paralysis of the facial nerve, has no justification.

CEREBELLO-BULBAR POLIOENCEPHALITIS ORIGINATING DURING OR AFTER EPIDEMICS OF INFLUENZA AND OF POLIOMYELITIS

INCLUDING THE RECORD OF A CASE OF EPIDEMIC ENCEPHALITIS OF THE LETHARGIC TYPE \*

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Three of the six cases recorded in this paper occurred during or after the recent prevalence of influenza, the history of an influenzal attack appearing to precede the occurrence of the involvement of the nervous system. The other three cases were observed at times when epidemic poliomyelitis prevailed. Five of the cases were clearly instances of focal encephalitis. The fifth case was doubtfully one of cerebello-bulbar encephalitis. In several of these cases the differential diagnosis most considered was that of cerebello-pontile tumor and localized encephalitis. A close scrutiny of the general symptoms of the cases, however, indicates that these were rather of an infection or toxi-infection than of a progressively increasing neoplasm. The latter was presumed in several of the cases, for a time at least, because it was held that the symptoms gradually augmented. Strictly speaking, this was not true, although the symptom picture was not completed as quickly as is usual in poliomyelitis or polioencephalitis. The sixth case was demonstrated pathologically to be one of epidemic encephalitis and progressed from the onset until death in about ten days. In the other five cases the course of the affection in its acute stage, however, corresponded to what we have not infrequently seen, namely, a rapid development of a part of the syndrome with a subsequent history of extension and recrudescence.

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\* Read before the meeting of the Philadelphia Neurological Society, March 28, 1919.

The study of these cases suggests, among other things, the relationship of epidemic poliomyelitis and epidemic influenza, especially as regards the involvement of the central nervous system in the latter disease. The literature which discusses the symptomatology and pathology of polioencephalomyelitis is very extensive, and will not be considered in this connection, except to refer briefly to the special types of poliomyelitis or focal encephalitis illustrated by the cases described.

Batten<sup>1</sup> has contributed an elaborate paper, brief references to which will be sufficient to cover most of the points we desire to bring out. A full bibliography of the subject is appended to his paper. Discussing the bulbar and pontile forms of the disease, Batten refers to Bremer's report that 12 per cent. of 400 cases showed evidences of encephalitis, involving the oblongata, pons or mid-brain. Facial paralysis was the commonest manifestation, while cases with ataxia, nystagmus and tremor formed the next most numerous group. Besides the facial nerve nuclei, those supplying the tongue, the palate, the masseter and temporal muscles were sometimes affected, either unilaterally or bilaterally. Lesions of the oculo-motor nuclei occurred, giving rise to a complete or partial ophthalmoplegia. Blindness was sometimes associated with the ocular paralysis. The observations of Batten and the others whom he cites on the blindness sometimes seen in poliomyelitis, and the rhythmic tremor associated with ocular and other cranial nerve palsies which occur in mid-brain lesions, are of much interest, but are not within the scope of the present contribution.

Cases are referred to by Batten in which ocular palsies with nystagmus were present and still others in which there was evidence of involvement of the fifth, sixth and seventh cranial nerves, the variation in symptoms depending on the situation and extent of the lesion.

Describing the cerebellar or ataxic form of poliomyelitis, Batten states that this type is characterized by the acute onset of ataxia, sometimes associated with ocular and other cranial nerve paralyses and alteration of articulation. Nystagmus was often absent. In some cases the cerebellar ataxia cleared up quite rapidly, and in others it took many months or years.

Batten and Wickman recognize the "neuritic" form of poliomyelitis to which we make reference because in one of the cases of the following series both cerebellar and neuritic symptoms were present.

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1. Batten, F. E.: *Acute Poliomyelitis, Brain, Lond., Parts 1 and 2, 39: (June) 1916.*

Batten refers to the occurrence of both second attacks of poliomyelitis and of relapsing cases. Our experience is that relapsing, or what is a better term, recrudescent forms of the disease not infrequently occur, as illustrated by cases in the following series. The patient after a first attack, which may be of moderate severity, has a decided increase or renewal of fever which results in marked cerebellar or cerebellar and paralytic phenomena. Besides these recrudescent or relapsing forms of cerebellar and other types of poliomyelitis, cases occur which from the first take on a course different from that usually described in the typical instances of the disease. They assume a sub-acute or sub-chronic character, the probable nature of the lesions not being fully exhibited for some weeks.

*CASE 1.*—Child 3 years old; influenzal attack followed by weakness and awkwardness in the use of the lower extremities; recrudescence of acute symptoms after three months; marked cerebellar asynergy affecting both lower and upper limbs; alternating strabismus and nystagmoid movements; no papilloedema; gradual improvement.

*History.*—This patient was a girl aged 3 years, who was brought from Vickburg, Miss., in the latter part of February of the present year. Last October she had an attack believed to be influenza, with high temperature, the acute symptoms lasting one to two weeks. The child had a tendency to be unsteady on her feet after she recovered from the febrile attack, getting gradually worse. About January 20, the patient began to have severe vomiting, after she had overloaded her stomach with apples and other food. She continued to be worried by her stomach for about ten days and about twelve days after the spell of vomiting, began to have great difficulty in standing and walking, stumbling and falling. In a week or less she was unable to stand or even to sit up straight. During the week before she was first seen by us the mother thought she had improved somewhat in her power of sitting up.

*Examination.*—This showed inability to stand alone, unless it was for a scarcely perceptible fraction of a minute. When she walked with assistance she kept the legs rather wide apart and was unable to gauge her position or stand with firmness. She had a little more control over the left than the right side. When she attempted to feed herself with a spoon she had difficulty in doing so, because she was awkward and did not reach her mouth accurately.

*Symptoms.*—Briefly stated, the patient's most important symptoms were a cerebellar station and gait, with also some marked cerebellar asynergy in the upper extremities—more pronounced in the right than in the left. She had also some involvement of her ocular movements of the nature of an alternating strabismus with nystagmus or pseudo-nystagmus, although this seemed to be rapidly disappearing. Dr. J. W. Croskey, the ophthalmologist who examined her, reported that she had no papilloedema.



*Clinical Course and Outcome.*—This patient remained under observation about ten days or two weeks, improving slowly but steadily in the use of her limbs and trunk.

The examination showed none of the general symptoms of brain tumor. The history indicated a febrile attack of some severity, leaving the child weak and awkward in her movements and a subsequent seizure with vomiting, after which the complete inability to stand and walk resulted. If the sickness in October was influenza with some poliomyelitis of the focal encephalitic type, a relapse or recrudescence of the febrile affection probably occurred three months later.

*CASE 2.*—Man about 30 years of age; influenza with temperature from 100 to 102 F.; headache, vomiting, vertigo and diplopia; cerebellar station and gait; paralysis of right external rectus and of right facial nerve; nystagmus on horizontal excursion of eyes to right or left; no papilloedema; rapid improvement with recovery in about one month.

*History.*—This patient was a physician, aged about 30, who recently had been living and practicing in West Virginia.

The patient stated that he had stopped work two weeks before he came under observation. For several days before that time he had not been feeling well. His temperature had been running from 100 to 101 F. He went to bed with a temperature of about 102, headache, and hyperesthesia over the left chest and right side of the face. He also suffered from dizziness and vomiting in the morning. He had some diplopia on looking to the left. His headache continued.

*Examination.*—Dr. W. T. Zentmayer reported that the patient had paralysis of the right external rectus and partial paralysis of the right side of the face. The fields of vision were normal. The patient was myopic, but had no papilloedema. Some nystagmus was developed in looking either to the right or left.

Our examinations confirmed the paralysis of the right external rectus and paresis of the right facial nerve. No motor fifth paralysis and no impairment of hearing were present. Nystagmus was developed in looking either to the right or left. He had a Romberg symptom with eyes closed and showed decided unsteadiness in walking. No hypermetria, or adiadokokinesis, or tremor was present. Knee jerks were very prompt, but a Babinski response was absent. He had no clearly determined objective loss of sensation, although at times he thought he felt a little better on the left than on the right side of the face.

*Clinical Course and Outcome.*—This patient went to Atlantic City where he remained for two weeks. In a day or two the paralysis of the right external rectus began to improve and in a few days had entirely disappeared. At the same time that the abducens paralysis improved, the loss of power in the seventh nerve distribution began to grow worse and in a few days was so marked that the patient exhibited almost a complete paralysis of the upper and lower branches of the facial nerve. In about a week this paralysis also began to clear up and when he was seen at the end of two weeks from the time when he was first examined, both the sixth and seventh nerves were practically normal. He still had a few nystagmoid movements in looking either to the extreme right or to the extreme left. Testing him for station and gait he was now practically normal, although he thought he had a little tendency to trend to the right in walking.

The history and examination of this patient indicated an influenzal attack with focal encephalitis, involving the cerebellum and bulb. Evidently, however, little destruction of nervous tissue took place, for the patient improved and in less than a month was almost normal.

*CASE 3.—Severe febrile attack, either influenzal or poliomyelitic, in a girl of 11 years; headache; uncertainty in station and gait, probably cerebellar; pain in limbs, trunk and head; some weakness in abduction and dorsal flexion of feet with partial steppage gait; probable involvement in a poliomyelitic process of cerebellum and peripheral nerves; recovery in a few weeks.*

*History.*—This patient was first seen by Dr. Mills, Jan. 17, 1912. She was then 11 years old. Four months previously she had a sharp attack of fever, supposed at the time to be typhoid, although this was doubtful. She had headache, chill and fever and at the end of about a week, when she was first seen by the family physician, her temperature was found to be 104 F. The high temperature lasted for two days and two nights. The attack was probably one of influenza or epidemic poliomyelitis. She was kept in bed for about a week. When she got on her feet she was found to be weak and uncertain in her station and gait. In a day or two she was able to walk fairly well, but from time to time had a return of the headache. About three weeks before she came under observation she became decidedly weak in the legs and had severe pain in the feet and legs, and occasionally shoots of pain in her trunk, arms and head.

*Examination.*—When first examined she had an uncertain station and peculiar gait. In walking she straddled, keeping the feet apart. She guided her steps by keeping her eyes on the floor. Examination for all the muscular groups of the lower extremities showed all movements preserved, but some weakness in abduction and dorsal flexion of the feet, these giving her what seemed to be a partial steppage gait. Her knee jerks were decidedly plus. She had a slight foot clonus on the right and no Babinski response on either side. Sensation was unimpaired and she had no nystagmus. She had no disorder of speech. Pupils were normal and she had no ocular, facial or upper limb palsies and no ataxia in the finger-to-nose test or the heel-to-knee test. The Wassermann test gave a very doubtful positive reaction.

The following opinion was given regarding this case:

"The history of the febrile attack looks more like a poliomyelitic (or influenzal) seizure than one of typhoid fever. The parents said the fever lasted only two or three days and the child was only in bed a week or a little more.

"The symptoms are peculiar and unusual. The child is somewhat ataxic and seems to have some weakness, but no paralysis, in the movements of abduction and dorsal flexion of the feet. The case may have been one of the extremely unusual instances of poliomyelitic cerebellar disease, that is, some inflammation and destruction of the cerebellum and other parts may have taken place. The pains in the limbs look toward a neuritis. On the whole, the prognosis is not altogether bad as the child may have reached the limit of her serious symptoms."

*Clinical Course and Outcome.*—This patient was seen for a few times for several months. She then passed entirely out of observation until February of this year, when she was brought for headache, mental depression and

irritability of the bladder. Examination for the old symptoms showed that they had entirely disappeared. Station and gait were normal. The Wassermann report was negative.

Final consideration of this case indicates that it was probably one of poliomyelitis, conjointly of the cerebellar and polyneuritic type, similar to cases referred to by Wickman and Batten.

*CASE 4.*—A woman about 30 years of age; numbness and some loss of power in the right half of the body developed suddenly, slowly increasing; six weeks after onset symptoms began to show marked exacerbation; examination showed on the left side paralysis of the seventh and sixth nerves, paresis in the motor fifth, and loss of hearing; vertical nystagmus and complete loss of lateral movements of the eyes; some loss of corneal sensibility on the left; sense of position and stereognostic perception lost; touch, pain, temperature and localization senses impaired on the right side; some ataxia in the finger-to-nose and heel-to-knee tests on the right; paresis in limbs of right side, with exaggerated knee jerk, foot clonus and Babinski reflex; perspiration localized in the right side of face and neck; gradual improvement in all symptoms, except the facial paralysis, the upper distribution of the seventh nerve being more markedly paralyzed than the lower.

*History.*—This patient was a single woman, aged about 30, who was admitted to the University Hospital on September 7, where she remained until Nov. 12, 1911. The case was one of much severity and of great interest as regards the question of diagnosis. Cerebello-bulbar tumor, meningitis and occlusion were suggested.

Until about July 4, a little more than two months before coming under observation, the patient had been quite well. One day she somewhat suddenly became faint and experienced numbness in the right side of the face and in the right arm and leg. She noticed also at the time some loss of power in the arm and leg affected. Gradually the power of the arm and leg became less. Until two weeks before coming for treatment, that is, about six weeks after the onset of her symptoms, she was able to get around without aid, although her vision was somewhat impaired. At this time, while on a shopping trip, her vision failed quite noticeably during the day. Her face was drawn up somewhat on the right side and her speech was affected. During the next ten days she grew gradually worse and three days before her admission into the hospital her symptoms rapidly increased.

*Examination.*—Neurological examination revealed the following: Complete left-sided peripheral facial paralysis, tongue going to the right on protrusion, and slight difficulty in swallowing water. Opening the mouth the jaw went to the left, showing motor fifth paresis. Movements of the masseters and temporals on the left were weak.

Sensation was normal in the fifth distribution on both sides, except for some loss of corneal sensibility on the left. The sense of position was lost in the right arm and leg, and touch, pain and temperature showed impairment in these limbs, this being somewhat more marked for touch. Marked astereognosis was present in the right hand. The sense of location tested for the right hand was much impaired. Active and passive movements were markedly diminished in the limbs on the right side, but not lost. Right grip was poor. Marked foot clonus was present on the right and the Babinski response was elicited with difficulty on the same side. The right side of the face and neck perspired profusely, the left remaining dry. Slight ataxia was shown in the finger-to-nose and heel-to-knee tests.

On several occasions from the time of this patient's admission to the University Hospital and as late as four years after this time the eyes were carefully examined and reported on by Dr. E. A. Shumway. The first report by Dr. Shumway made on the day of the patient's admission to the hospital, Sept. 7, 1911, was as follows:

"Spasmodic closing of right eyelids; left eyelids paretic, unable to close them. Pupils contracted; left, pin point size; right, about  $1\frac{1}{2}$  mm. React to light. Vertical nystagmus, greatly increased in looking upward or downward. These movements are well carried out; complete absence of all lateral movements of eyes. Eye-grounds entirely normal; no blurring of nerve edges or disturbance of retinal circulation. Right vision, about 4/25; left vision, the same."

A week later Dr. Shumway reported: "Pupils still contracted; vision 4/20; apparently myopia from ciliary spasm. Eye-grounds show no changes. Refraction is low hyperopic astigmatism."

Other reports made by Dr. Shumway during the month after the patient was admitted to the hospital were as follows:

Sept. 25, 1911: "Returning movement of eyes toward right, especially of the right eye, which moves outward and downward. Left eye moves to the right, but much less well than right eye."

Sept. 26, 1911: "Right eye shows blurring of upper and lower edges of disk margin; no venous tortuosity. Left nerve slightly blurred similarly."

Oct. 6, 1911: "Nerves show no further blurring. Pupils less contracted. Movement of right eye toward right improved. No movement of eyes to left."

Examinations of her ears, nose and throat were made by Dr. Ralph Butler, who reported as follows:

"Pharynx examined for sensation showed practically no difference on either side of throat. In the larynx there is no paralysis either unilateral or bilateral, of vocal cords. Left drum head moderately retracted, especially the posterior half; mobility excessive, especially the posterior half. Tenderness along insertion of sterno-cleido-mastoid. Hearing for watch tick, air and bone conduction lost on the left; normal on the right. With tuning fork the patient recognized vibration on left, hears on right. Bárány's thermic nystagmus test—no result produced in the left ear (temperature 78 F.); maybe due to loss of lateral movement. Normally under this test both eyes should move to the right."

*Clinical Course and Outcome.*—It would be tedious and somewhat unprofitable to trace the history of this patient day by day or week by week from the time she was admitted to the University Hospital. An effort will therefore be made to summarize the results of observation and treatment. After the first few days gradual improvement began, this especially showing itself in returning power in the right extremities with concomitant improvement in the ataxia and sensory impairments. In a little less than two months the patient was able to stand and move around with difficulty. Her vision and loss of associated movements improved steadily. The facial paralysis persisted, as did also that of the sixth nerve. The seventh nerve paralysis was unusual in the fact that the upper distribution of the nerve was more pronouncedly affected than the lower, as shown by the loss of power in the frontalis and orbicularis palpebrarum. The lower distribution was also



paralyzed, but the patient in a comparatively short time had a return of the power to draw the face to the left and retract and elevate the corner of the mouth. The patient has continued under observation for years, being seen at comparatively long intervals—the last time, about a year ago. Eventually she recovered almost entirely, with the exception of the seventh nerve paralysis.

This case, in some respects one of the most interesting of the series, viewed in the light of observations extending over years, was clearly one of poliomyelitic destruction, cerebellar, bulbar and pontile. Like the case which follows, it for a time strongly suggested the diagnosis of tumor. Operation was at one time discussed and dismissed.

Several diagnoses were suggested in this case, these being tumor, meningitis, occlusion of the posterior inferior cerebellar artery, and encephalitis affecting the cerebellum, oblongata and pons. Tumor and meningitis were dismissed after consideration, the general symptoms of these diseases being absent. There was much in favor of the diagnosis of occlusion, especially corneal anesthesia on the left side and impairment of sensation, cutaneous and deep, in the opposite half of the body. The persistent destructive symptoms, however, were those which involved the motor cranial nerve nuclei and tracts and the left pyramidal system was evidently to some extent implicated. Sensory symptoms have been recorded in association with the motor nuclear and pyramidal signs in epidemic encephalitis, and even in spinal poliomyelitis. The course of the disease seemed to us rather to indicate an inflammatory process, at first of subchronic or subacute character, with later severe exacerbation. The sensory symptoms cleared up in a comparatively short time, while those referable to the motor cranial nerves, especially the seventh and sixth, persisted, the facial paralysis remaining permanently. On the whole, it seems to us that the diagnosis of a cerebello-bulbar encephalitis of the poliomyelitic type was most probable.

*CASE 5.—A boy, five and a half years old; an attack of nausea and vomiting lasting several days; diplopia, weakness of the right side of the face, and awkward station and gait; paralysis of the right external rectus; no papilloedema; examination showed involvement of the fifth, sixth, seventh and eighth nerves; hypermetria, adiadokokinesis and tremor on the right side; deep reflexes exaggerated on the right; on the left, foot clonus and Babinski response; chief symptoms cerebello-bulbar on the right with some pyramidal symptoms on the left; no sensory manifestations; Bárány examinations were reported as indicating probable brain tumor; a first operation seemed to disclose a cerebello-pontile tumor; second operation made this doubtful; patient died, but no report on necropsy was obtained.*



*History.*—The patient, a child, 5½ years old, was reported to have been very healthy until the age of 2 years when he had an attack of malaria, after which his appetite and general health were somewhat impaired. Six weeks before coming under observation he had an attack of nausea and vomiting which lasted several days. He may have had fever, but no record of this was received by us. After this attack he saw double. Some weakness of the right side of the face was noticeable and he stood and walked awkwardly. The patient was referred to Dr. Frazier and Dr. Mills by Dr. B. R. Tucker with the idea of having an operation should the case be decided to be one of neoplasm. Ophthalmic examination showed paralysis of the right external rectus and no papilloedema.

*Examination.*—The following is a summary of some of the results of the examinations of this patient:

In the first place, he had cranial nerve involvement—fifth, sixth, seventh, and eighth. Cerebellar symptoms were on the right side, hypermetria, adiado-kokinesis and tremor. His deep reflexes were exaggerated. The knee jerks and Achilles jerks were present and active. On the opposite side, he had a true Babinski response and an abortive foot clonus. The examination, in brief, showed some probable involvement of the pyramidal tracts on the right, although the chief symptoms were cerebello-bulbar and pontile on this side. Sensory changes were entirely absent. The examination of the eyes of this patient by Dr. S. D. Risley showed no papilloedema, no pupillary abnormalities, and no ocular symptoms, except the paralysis of the external rectus. Bárány examinations were made by Dr. Isaac H. Jones, who reported his belief that these indicated a cerebello-pontile growth.

*Clinical Course and Outcome.*—With regard to the results of the examinations, these did not seem to be conclusive for brain tumor. Dr. Jones believed that there was a tumor of about an inch in length, reaching as high as the cerebral crura, but it seemed to us that a destructive lesion involving the nuclei and tracts of the nerves indicated by the symptoms might as readily explain the case. It was noticeable in this case also that the symptoms, with the exception of the involvement of hearing, were all motor and it seemed hardly probable that a cerebello-pontile tumor of the size apparently indicated would not cause some impairment of sensation, directly or by pressure. Such a tumor would almost certainly cause papilloedema and yet both fundi remained normal.

It was finally decided to operate. Dr. G. P. Müller performed two operations on the case. The first was a suboccipital craniectomy on the right side. The surgeon reported that there was probably a tumor of the right cerebello-pontile angle, over which certain of the nerves were stretched. It was considered at the time of this operation inadvisable to go further. About two weeks later a second operation was performed. The nerves were located, but now no tumor could be seen or felt. At the site of the pons and in the angle the brain had a grayish appearance as though an inflammatory reaction had occurred at this point. The surgeon felt that the boy had either some form of meningitis which had healed and left him with an exudate, or else that he had a tumor deep in the brain causing the symptoms.

This patient died a short time after returning to his home in Virginia, but we were not able to obtain any record of a necropsy. We regard the case as of much doubt from the standpoint of diagnosis. While there was much in favor of the diagnosis of a cerebello-pontile tumor, contradictory data were equally marked.

*CASE 6.*—Patient, female, 17 years old; illness began with diplopia, headache and vomiting; patient developed a stuporous or semi-conscious state from which she could be aroused by prodding; upper eyelids never elevated; catatonic state; some rigidity of the neck; horizontal nystagmus; left external rectus paretic; no papilloedema; all muscular movements slow and studied; deep reflexes absent or very weak; no Babinski reflexes; temperature ranged from 99.3 to 102.4 F.; urine and blood were normal; patient died on about the tenth day of illness; after hardening, naked eye examination showed softening and small hemorrhages in cross sections of the midbrain, around the aqueduct of Sylvius, and in the upper part of the pons; sections from the midbrain and the pons showed many minute hemorrhages and intense perivascular round-cell infiltration; sections from the oblongata and spinal cord at various levels, from the walls of the third ventricle, and the optic chiasm showed much less marked infiltration without hemorrhages; sections of the cerebellar and frontal cortex showed infiltration of the pia.

*History.*—A girl, aged 17, was admitted to the Philadelphia General Hospital on March 5, 1919, and died three days later. The patient was in the service of Dr. B. F. Stahl, to whom we are indebted for the privilege of reporting this case. She was unmarried, one of a large family, all of whom are healthy. There was no history of influenza during the recent prevalent epidemic. One week before admission into the hospital she complained of double vision while working and was told by her companions that her eyes were crossed. During this week the patient suffered from headaches and vomiting.

*Examination.*—When first seen the patient was in a semi-conscious condition. She could be aroused sufficiently to obey simple commands, but if not continually prodded would soon lapse into a state of semi-consciousness. The upper eyelids were never elevated, giving the patient an appearance of double ptosis. A catatonic state was present, the arms and hands after placing being maintained in grotesque attitudes for some minutes. There was a moderate, but definite, rigidity of the neck. Brudzinski's sign was not present and Kernig's sign was doubtfully positive.

Horizontal nystagmus was present and was fairly well marked. The pupils were widely dilated and reacted very little to light. It was impossible to make the patient converge. She had been attending an eye clinic and a mydriatic had been used. The left external rectus was paretic. The eye-grounds were healthy. As far as could be determined no other cranial nerves were affected.

After much insistence the patient could perform the finger-to-nose test in a lackadaisical manner, but without any ataxia or tremor. The extremities were not paralyzed, although all muscular movements were slow and studied. The deep reflexes could not be obtained in the upper extremities and in the lower extremities were very weak, almost to the point of abolition. Plantar stimulation gave plantar flexion of the toes.

The temperature, by axilla, ranged from 99.3 to 101 F., and a few hours before death it arose to 102.4. The pulse on admission was 90 to the minute, soon rising to 140 where it remained. The respirations were from 25 to 40 to the minute. There were one or two profuse sweats and at times a goodly amount of tears without other evidence of emotionalism.

The lungs and heart presented no abnormal condition. The urine was negative, as was also the serological reaction. Lumbar puncture was per-

formed without apparent discomfort to the patient, but unfortunately a bloody fluid was obtained, making a cell count impossible. The fluid did not contain any organisms.

*Necropsy and Histologic Examination.*—A necropsy was performed three hours after death. The heart muscle was flabby, but otherwise the abdominal and thoracic viscera showed nothing abnormal.

The brain and cord before section showed nothing on gross examination. They were placed in a solution of 10 per cent. formalin for ten days. Sections for histologic study were made under the supervision of Dr. W. G. Spiller in the Laboratory of Neuropathology of the University of Pennsylvania. These were from the midbrain, the pons, the oblongata, various levels of the cord, the walls of the third ventricle, the second, third, fourth and sixth cranial nerves, and from the frontal and cerebellar cortex.

On sectioning the midbrain and pons, areas of softening were visible to the naked eye in the region of the aqueduct of Sylvius.

The sections were stained by the Weigert, the hematoxylin and the thionin methods. The midbrain and pons in the neighborhood of the aqueduct showed intense perivascular round-cell infiltration and minute hemorrhages. This process was most marked around the aqueduct and decreased as the neuraxis was descended and ascended. It also faded out toward the periphery in the sections through the aqueduct. The oblongata and spinal cord at various levels showed decreasing perivascular infiltration without hemorrhages, except in the lumbar cord where one or two small hemorrhages were observed. Moderate pial infiltration was seen in the lumbar region. The walls of the third ventricle and the optic nerve at the chiasm showed the same perivascular round-cell infiltration. The third, fourth and sixth nerves showed nothing. Sections through the paracentral lobule exhibited rather marked round-cell infiltration involving both the cortex and the pia. The Betz cells were poorly stained, the nuclei were eccentric and the substance of the cell bodies was granular. In the frontal and cerebellar sections nothing was visible, except pial infiltration, the cortex appearing normal.

This case was clearly one of polioencephalitis similar to cases of epidemic encephalitis which have been described by Economo,<sup>2</sup> Netter,<sup>3</sup> Kinnier Wilson,<sup>4</sup> Bassoe<sup>5</sup> and others.

The cases here recorded were probably of the same pathologic character, only differing in the location, severity and destructiveness of the lesions present. After all, the symptomatology of the fatal and nonfatal cases differs chiefly in the evidences of the extension and restriction of the lesions probably present. The existence of lethargy

2. Economo: *Verein f. Psych. u. Neur. in Wien*, April 17, 1917; *Wien. klin. Wchnschr.*, May 10, 1917.

3. Netter: *Soc. méd. des Hôpitaux de Paris*, March 22, April 12-19-26, May 3, 1918; *Bull. de l'Acad. de méd.*, May 7, 1918.

4. Wilson, Kinnier: *Brain*, Lond., 1906; *Lancet*, July 6, 1918.

5. Bassoe: *J. A. M. A.* **72**: (April 5) 1919.

or stupor or semi-stupor in our sixth case, as in other cases, may have been conditioned, as has been suggested by several observers, by the intensity of the pathologic process in the region of the midbrain. In other words, the cases of encephalitis with lethargy have largely the symptomatology of polioencephalitis superior. Whether the etiologic factor in cases such as those here recorded is the same as that in epidemic poliomyelitis still remains to be determined.

## THE WAR NEUROSES AS PHYSIOLOGIC CONSERVATIONS

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### INTRODUCTION

This paper was written because it seemed an opportune time to set down in a permanent fashion the story of the effort made by the neuropsychiatric service of the A. E. F. to meet and combat the war neuroses. It has to do with matters of organization and the development of a point of view. It is largely with the latter that the author feels that he is properly concerned.

This story could not be told without frequent mention of Base Hospital 117 which was the special hospital for war neuroses at LaFauche. As medical director of this hospital from its beginning the author was given the privilege of seeing the various factors that went to make up this point of view develop. It is called in this paper the A. E. F. point of view. This is entirely an unofficial designation, and as a term has merely a connotative value.

In matters of clinical description, classification and mechanism, the responsibility is largely the author's, and although much that is contained in that part of the paper is a result of constant contact with an unusually intelligent, keen-minded and critically inclined staff, yet the conclusions arrived at are the author's own, and, as such, subject to whatever adverse criticism they merit.

The author is indebted to many men who have been concerned with the war neuroses and to many papers, books and monographs. Among the numerous sources in this literature the following deserve mention as being helpful: the various publications of Col. Charles Myers, Colonel Mott and Major Rivers of the B. E. F., and Yealland's book and McCurdy's monograph, and especially MacDougal's *Social Psychology*, a book full of wisdom, insight and inspiration.

I desire in this place to express my gratitude to the group of London neurologists whose talks on the war neuroses helped to clear up many a puzzling problem. To Henry Head, especially, much of what might be called the physiologic way of thinking is due.

The debt to Captains Thom and Hall, Lieutenants Durkin, Gale and Stout and to Captain McConnelly, the first group of men who made up the staff at Base Hospital 117, is too great to be adequately expressed.



Lastly to Col. Thomas Salmon, whose genius for organization, insight into the soldier's mind, and uncanny knowledge of things military made it possible to put into activity the organization to which his name will always be attached, the author makes due and grateful acknowledgement.

#### THE POINT OF VIEW DEVELOPED IN THE A. E. F.

One of the most significant attempts to deal with a medical problem associated with the carrying on of active warfare was the focusing of the neuropsychiatric department of the A. E. F. on the war neuroses. This was only a part of its work, but in the course of the unfolding of this scheme, there developed a point of view and a conception of the whole problem that may be said to be characteristic and, in a sense, typical of the American Expeditionary Forces.

It is the purpose of this paper to describe this attempt; to note the various parts of the machinery at work; to formulate the problem as it developed and to describe, as clearly as may be, the theories and notions as to origins, causes and mechanisms which came out of this attempt. An effort will also be made to translate this attempt into a working basis for the civilian type of neuroses so that whatever of truth came out of this experience may find an application to the same kind of problems, less dramatized perhaps, which have been so common in times of peace.

The war neuroses, as is well known, had presented both a medical and a military problem to each of the allied armies and probably to those of the central empires. Each army attempted to solve this problem, and, in working out a solution, more than purely medical factors had to be considered. Every medical problem in an army engaged in active warfare has many phases that are not met with in the same army at the stage of preliminary training, or under conditions that obtain at points removed from the zone of warfare. It is this multiplicity of factors which allows the development of individual and characteristic points of view and it is this which has given to the war neuroses an interest that is, in a measure, national. Given a set of factors which in their very nature tend to be complicated by distance from bases, transportation difficulties, hospital and divisional organization, and many others too numerous to mention, there is room for them to influence the plans of organization devised to meet the problem. Thus, on the one hand, the war neuroses stand out as a distinct medical entity, which in itself takes on no national peculiarities, and on the other hand, they appear as a military problem which is surrounded by sets of circumstances peculiar to one army alone.

The American Expeditionary Force was different from all the allied armies in that it was the only considerable body of troops so far removed from its base that transportation to home hospitals of

patients with war neuroses was absolutely out of the question. Therefore, these cases had to be treated or handled at or near the actual zone of fighting. At the very outset it was decided to keep such cases in France. On account of this decision the experience gained by the B. E. F. with the same type of cases was not applicable to our own problem. The fact that the American Army was fighting on foreign soil under foreign conditions to which it was difficult for so new an organization as ours to adapt itself, multiplied the difficulties of adjustment. In the French army it was an easy matter to organize special hospitals; to use for special purposes those already organized; to send the soldier back to his home for brief periods, and to take advantage of all the therapeutic means which proximity to home organizations permitted.

In the B. E. F. a somewhat similar condition existed, as return to England was simply a matter of Channel crossing, after which the whole of the medical resources of Great Britain was open to the soldier afflicted with this condition. Even if return to England was considered inadvisable, there were its hospitals and other institutions ready to take the overflow and to relieve the congestion which would be bound to occur if the number of cases should increase beyond the capacity of the hospitals in France.

A study of the methods used by these two countries in dealing with this problem shows that such physical influences had a more marked effect on their attitude to the war neuroses than any purely medical consideration. In the earlier years of the war the plan appeared to have had the definite purpose of getting these cases out of the way as quickly as possible. That there was a change in this policy is true enough, but even in the later months there were steady streams of such cases bound for back areas and toward home.

Whatever the advantages or disadvantages of this system may have been, and it is not the purpose here to criticize or comment on what was done in other armies than our own, the fact remains that the A. E. F. could not follow it. It could and did take advantage of the experience gained by other nations, but as experience only, and used it according to the conditions set for solving its own problems in its own way. From the beginning America was forced to develop a scheme of her own in dealing with the war neuroses and from this necessity, if for no other reason, arose what may be termed the attitude of the A. E. F. to the problems presented by the war neuroses. Certain physical factors controlled the formulation of this attitude, giving to it a certain positiveness and a certain definite directive power which were not found in the experience of other nations. As before alluded to, transportation difficulties forced the issue immedi-

ately, and made the central part of the scheme—that is, the attempt to solve the problem in France, or at any rate, away from home—of vital importance. When this decision is properly understood other factors on which this attitude was based follow as logical and necessary results.

If the war neuroses had to be handled in France there must be an adequate machinery. Therefore, an especially trained medical force was required. In this way the war neuroses became departmentalized and a special medical service grew up to care for them. This organization will be described later in this paper.

#### FACTORS LEADING TO THE A. E. F. CONCEPTION

An important medical element in making up the point of view of the A. E. F. was the notion of the war neuroses developed in the minds of the senior consultant in neuropsychiatry—Colonel Salmon—and some of the chiefs of departments under him. This was based primarily on a conception of the war neuroses as an aspect of primitive defense of the human organism against the traumatic incidents of warfare. The defense mechanism inserted itself automatically between the soldier and a repetition of the same or similar incidents which in the first place caused the soldier to react as a war neuroses case. As a result of this view formulated early enough to make it a part of the general scheme of treatment and organization, war neuroses were recognized as very real conditions, one to which any soldier given a succession of etiologic incidents, might fall a victim. In this way, also, the soldier could be viewed objectively and dispassionately in relation to his neurosis and the same method could be followed as is in vogue in the study of the many types of infections and other diseases to which a soldier in the performance of his duty is subject.

The question of the soldier's participation in the formation of his neurosis, how much conscious effort went into it, the rôle of exaggeration and malingering and other confusing incidents might then be made the object of legitimate inquiry uninfluenced by preconceived notions in respect to courage, bravery, wish, desire, cowardice, etc.

All of this created in the minds of the neurologists who had such cases under their care, a desire first of all to help the soldier, and then to fulfill his own military duty, which always centered about the effort to make of a sick or wounded soldier, as good a fighting man as was possible under the circumstances. The civilian notion in a similar case had to be forgotten and that of the military physician substituted.

These, in brief, represent the factors which went to make up what may be described as the A. E. F. point of view. To this may be added

the fact that from the chief surgeon of the A. E. F.—General Ireland—and his successor—Colonel McCaw—the department of neuropsychiatry and particularly the hospitals and field organizations that had to do with the war neuroses, received at all times the fullest support and encouragement. Perhaps, in this fact lies more of the uniqueness of the A. E. F. attitude than any of the foregoing statements. The American point of view, therefore, depended on the unique situation of the American Forces, which made it necessary to solve the question of the war neuroses in France; the recognition of the war neuroses as a disease entity; a realization of its mechanism of defense; a definite neurological organization to care for such cases, and above all, the cooperation and support of the chief surgeon of the expeditionary forces.

THE NEUROPSYCHIATRIC ORGANIZATION OF THE A. E. F. WITH REFERENCE TO THE WAR NEUROSES

The medical organization to take care of the war neuroses should be described because it forms what appears to be a distinct and definite contribution to the subject of war medicine. In any future war and, perhaps, under certain conditions in times of peace, similar organizations might prove effective. By this is meant that in all medical problems there is a certain aspect of war or of conflict and, to meet them effectively, an organization should have in it something of the elasticity, enthusiasm and coordination which the neuropsychiatric machine in France appeared to possess.

The organization passed through two stages, each of which warrants some comment. It was at first assumed that the war would be a long one, covering some years perhaps, and that the fighting for a time at any rate, would be either trench in type or more or less stabilized, so that the lines of battle would move very little either forward or backward. It was also assumed that the American troops would occupy a given sector of the Western front, and that the contingents would arrive there in groups of a given size. The American Army, it was supposed, would never be larger than about one million men. So it seemed an easy matter to calculate the percentage of war neuroses according to a fixed percentage taken from the experiences of our Allies and provide sufficient hospital facilities to take care of them.

The neuropsychiatric organization was briefly as follows: A special hospital for war neuroses was to be established within ambulance convoy from the lines, that is, within 20 miles or so from the front. From the divisions, through the division psychiatrist, would be sent to this base hospital by ambulance those cases presenting the more severe symptoms of the war neuroses. From this hospital those cured would



be sent forward to their own divisions; the others to various military duties in the S. O. S. A calculation based on the statistics in the B. E. F. appeared to show that in an army of about 300,000 men, a hospital of 300 beds would be ample, and with each succeeding contingent of this number of men, a similar base hospital could be established, the unit being kept standardized. Such hospitals were to be staffed by trained neurologists, and neurologically trained nurses and personnel. The treatment was to include all methods found useful in home hospitals, etc. In short, the plan contemplated a therapeutic effort in fair proximity to the front line similar to that in vogue in well equipped and staffed institutions under home conditions. The theory was that in the A. E. F. the soldier with war neurosis should be treated within the zone of active warfare just as he would be if he had been sent back to the United States.

In the earlier months of the activities of the A. E. F. this organization received its first test, and that it met that test was proof rather of its resiliency than of its entire fitness to meet conditions as they really developed. The idea that soldiers with war neuroses could be sent back to the base by ambulance from the divisions within forty-eight hours was found to be utterly impracticable. Two important conditions prevented this. One was that there was no American front in the previously accepted meaning of this term, the other that transportation could not be arranged for. What ambulances were available were needed for the wounded and for work in the front areas. During the months of June and July, when the series of engagements leading up to and including the Chateau Thierry fight took place, there were a large number of cases diagnosed as war neuroses. The percentage in some instances running as high as one out of five casualties. Although at that time the special hospital for war neuroses, known as Base Hospital 117, was in active service, only a relatively small number of these reached there as acute cases. Many hundreds were sent to far lying base hospitals — Bordeaux, Limoges, Paris, etc. — carried there by the hospital trains as part of the regular convoy of sick and wounded. Days and even weeks elapsed before such cases reached the special hospital which was planned, staffed and organized to care for them. Their stay at general hospitals accentuated, fixed and stereotyped their neuroses, because the first duty of a general hospital naturally was to the severely wounded and the severely sick. Consequently these cases did not receive, as a rule, expert neurological care. By far the greatest number of cases, then, which came to Base Hospital 117 were the severer and fixed types, although there were always a fair number of acute cases which came in rather by the chances of occasional transportation or from neighboring hospitals



within easy ambulance distance. This early experience and the fact that the fighting began to be open and the line advancing led to the readjustment of the scheme of organization to meet the changing conditions of the fighting on the Western front.

This showed plainly two things: (1) that with an advancing line of battle the war neuroses tended to escape proper treatment in the front areas, and (2) that in the difficult conditions of handling the sick and wounded many cases of exhaustion, temporary fear reactions and mild shock conditions were set down as instances of war neuroses. Many of these patients would recover promptly if given a short rest, especially if they came under the care of men who were neurologically minded, trained and interested. It became increasingly evident that forward screening was an essential element in the proper organization of the machinery to care adequately for those cases. Therefore, there were established forward neurological hospitals located on radii spreading out from Base 117. They were staffed largely from men who had been trained there and who were imbued with the ideals and spirit of that place and, who could express in their contact with the soldiers—subjects of war neuroses—the attitude which had developed there and of which they had a part in developing.

These forward area hospitals were Army hospitals, three in number, of from 300 to 500 beds, located at first, roughly speaking, about 10 miles from the front lines. In front of them were the *triages* connected with the field hospitals in charge of the division psychiatrists, some of whom had spent shorter or longer periods at Base 117, and all of whom showed the most active spirit of cooperation with the general plan of the organization behind them. The object of the *triages*—that is, the forward screen—was to eliminate immediately, or within a few hours, such men as were mildly shocked, or merely frightened or exhausted who needed only the skillful assurance of the neurologist that they were but temporarily out of the game, and so were enabled to get hold of themselves and return to their fighting contingents. Those who were seriously affected were sent back immediately to the forward neurological stations, where they remained from a few days to two weeks or so, and from there were sent forward, while the very stubborn cases or those patients in whom the war neuroses had become more firmly established, or who presented symptoms more difficult to treat, were sent back to the base, which at that time, owing to the advance in the Allied lines, was anywhere from 60 to 90 miles back. To the base came also such patients as had escaped the screens and had been transported by trains to distant bases, or hospital centers and also such patients as had developed war neuroses enroute.

It can be easily understood that there was in this plan a degree of elasticity and resiliency that was capable of expansion or contraction to suit the changing conditions of actual warfare. As a further device, a mobile neurological hospital was contemplated which should serve the war neuroses in much the same way that the mobile surgical units served the wounded, so that no matter how rapidly the line advanced, a neurologically equipped organization would be in touch with it. The organization just described was that of the First Army. The Second Army was to be served in like manner, and if there had been a third in the actual zone of fighting, the same kind of organization would be developed. With the armistice, however, the organization of the First Army was the only one which had the test of actual experience.

Nothing so far has been said about the personnel, of which a great deal should be written and no doubt will be. It is worth mentioning, however, that it is the men who vitalize any organization, and if the plan just outlined did effective work, it was because the men in it were keen, enthusiastic and, as a whole, knew a great deal more about the war neuroses than would have seemed credible, when the brief time permitted for training was taken into account.

#### BASE HOSPITAL 117

As the focus of this scheme centered so largely about the special hospital for war neuroses at LaFauche, known as Base Hospital 117, some description of this place and what it tried to do, is essential for a thorough appreciation of the total scheme as has been outlined. The point of view of the A. E. F. was in a great measure crystallized there. The conception of the mechanism of the war neuroses which will be described later in this paper was largely a result of the studies and experience made there, and no better introduction to the description of the war neuroses from what may be designated as the clinical aspect, can be thought of than through a brief statement of this hospital, its plan, purpose, spirit and ideals. As medical director of this hospital from the beginning of its activities, the author had unusual opportunities to watch and study the growth, development and crystallization of ideas; those of the staff as well as his own with reference to the various problems of the war neuroses.

While much of what will be set down here may be regarded as in a sense the conception developed at Base Hospital 117, the author must be held entirely responsible for the expression of these views. It might be said that they represented a body of facts or theories filtered through his own mind in the various contacts between his staff and

himself, through numerous conferences, informal discussions, personal exchange of views, teaching and other activities.

Base Hospital 117 was located at LaFauche, a small village in the foothills of the Vosges Mountains on the main highway between Chaumont and Neufchateau. The hospital, at first a small camp hospital of 300 beds, rapidly grew to a capacity including tents of about 1,200. The location was an admirable one on account of the natural beauty of the place, its loneliness, and the fact that it was isolated from other hospitals or hospital groups. In spite of this, it was remarkably accessible—an important railroad going directly to the front areas through Toul; Nancy was within a half mile of the hospital, and paralleling this was the Route Nationale connecting many important towns, the names of which are intimately associated with the front held by the American troops. The hospital was an ordinary hut hospital with a chateau about a fourth of a mile away for an Officers' Ward and a convalescent camp across the meadows. It had about 90 acres of farm land which was later to be used as a part of the treatment of cases. This was the first American hospital for the treatment of war neuroses established in France, and it was part of the plan of Colonel Salmon that here was to be tried out and tested the methods of treatment and the problem of handling the war neuroses in the A. E. F. It was this semi-academic quality given to this hospital almost from the first, that led to the development of what seems to have been its unique feature. It early began to have a teaching atmosphere which later resolved itself into a kind of actual, informal school—a type of crude full time military university so to speak, which made it a delightful place to be in and an interesting place to visit. The staff—that is, the original staff of nine men—was made up of those selected in the United States, and by a group of four men who had received their training chiefly under Mott at the Fourth London General Hospital.

The staff of nurses was carefully selected, some training in psychiatric or neurological nursing being the necessary requirements. A department of civilian aids in charge of a therapeutic workshop, became a very valuable adjunct in completing treatment in functional paralyses and tremors. Such details are mentioned merely to bring out the general scope of this hospital and to emphasize again the fact that it aimed to reproduce somewhere near the active fighting and at a place close enough to the Army organizations in the field, as far as it was possible to do so, conditions of treatment not differing, in spirit at any rate, from institutions at home. Within reach of the atmosphere and discipline of an active fighting army the soldier with war neuroses was to be given treatment which was to embrace all methods which

were found useful. The only vital difference between such a hospital and one located at home was that in the former, the soldier was kept in touch with his military environment and, therefore, the necessity of being cured and returning to his place in the line was automatically emphasized from the moment of his admission to the time he left it. With the general scheme of the neuropsychiatric organization in France in mind—that is, as far as its relations to the war neuroses is concerned—a consideration of the war neuroses as a medical problem and apart from the scheme of organization for its care logically follows.

#### STATEMENT OF THE PROBLEM OF THE WAR NEUROSES

The war neuroses present three important aspects for consideration, each one of which necessitates some special notice. First, there is the military aspect of the problem. This concerns itself with the important fact that the soldier with war neuroses is, in most instances, physically intact and very often in splendid physical condition. His symptoms of disease are a disturbance due to an intricate psychical mechanism of defense based primarily on the primitive instinct of self-preservation. He obviously cannot be classified as mentally unfit, nor can he be regarded as physically disabled, yet he is incapable in this state of acting the part of a soldier. The fact that he has, at times, only a limited power of volition over his disability removes him from the class of malingerers, so the aspect of a man neither sick nor well presents a military problem of an unusual sort. As many of these patients have been good soldiers, judgment as to their potential ability for further military life must be suspended. Where to place him and what to do with him are questions that present themselves immediately. A soldier physically fit, mentally not affected, in every outward aspect a good fighting type, not a coward, often wanting to get back to the line, but held in the grip of a mechanism which negatives his soldierly impulses, presents a problem that has mystified again and again an officer who has at heart the best interests of the men under his command. Where the number of such cases increases to such an extent as to seriously threaten man power, then more than ever do the war neuroses assume the dignity of military importance. Therefore, no statement of the problem of the war neuroses can be made without considering from the very beginning its military significance. Many of the errors made in attempting to solve the problems of the war neuroses among soldiers might have been avoided if at all times the military point of view had been kept in mind. This point of view might be expressed as the effort toward returning such a patient to his former status as a soldier with the assumption that this is a perfectly possible thing to accomplish. The



second aspect is purely clinical. It may be very simply stated in this way: A traumatic incident or a series of them acting on the human organism, causes that organism to respond functionally by sets of abnormal reactions which becoming fixed, stereotyped and organized as symptoms gives the picture of disease called—in the A. E. F.—war neuroses, or shell shock according to the English designation. Obviously the thing to do is to classify these appearances into types, designate them in some way, differentiate them from similar types seen in other conditions, and devise some means by which they can be adequately treated and managed. The significant thing is that the war neuroses are essentially reactions to the varying incidents of war and that there is always present a known set of etiologic factors. There are, further, a fixed etiology, a varying effect from the etiologic incident, and a therapeutic aim, which has as its chief incentive the return of the subject of war neuroses back to the conditions which in the first instances caused them to appear. That, in brief, is a statement of the medical problem and the clinical point of view.

The third phase of the statement of the problem is that of mechanism. This implies that it is necessary to know something of the processes by which the clinical syndrome is activated and to regard the presenting symptoms more as an end and a result of some deeper lying, but not readily understood process. Something that must be first appreciated before anything really tangible can be done for the subjects of war neuroses. It is this emphasis on mechanism and not on clinical type, this apparent indifference to symptomatology which separates out the war neuroses from almost any other clinical problem.

The war neuroses, therefore, present these three chief aspects for consideration, an understanding of which makes the medical solution more easy of accomplishment. In addition, there are several incidental considerations which have forced themselves, often needlessly it might seem, into the problem, often hopelessly confusing it. Of no disease, with well recognized clinical expressions, has the question of the personal responsibility on the part of the victim come into court at all. If it does, it is easily dispensed with under the term malingering, but here there is brought up the question of cowardice, often disguised by another name, with the notion that in some way or other it can help in the solution by accentuating the personal weakness of the individual. This tendency leads to the theory that any soldier who develops war neuroses does so because he lacks courage, and does not have the moral elements which are essential to the make-up of a good soldier. The difficulty in such a point of view lies, not in the fact that an ethical label is put on a clinical syndrome, but solely in the fact that such a label serves no purpose whatever. It neither



cures the soldier, nor, what is of greater importance, can it return him to his work in the fighting lines. With an unlimited man-power, probably such a point of view would do no particular harm, as the proportion thus labelled and placed outside of military use would not be very large, but in a long war, such as this one threatened to be at the period of American participation, this kind of thing in two or three years would have become a serious handicap in keeping up the contingents of troops necessary for the purposes of offense and defense. The question was further complicated by the injection of the question as to the usefulness of a cured war neurosis case for front line work and the question of recurrence. Was the soldier permanently cured or not? The real question was rather—what are the chances in a given case of a soldier being exposed a second time to the same sequence of events as before? Clearly he might react in the same way and become for the second time a subject of war neuroses, experiencing in this way the identical thing that a soldier who receives a second wound after he has been cured of the first one and returned to duty as an active soldier. In many other ways too numerous to mention in this place, there was injected into the question confusing notions as to morale, personal responsibility, and considerable of what might be termed prejudiced and preformed objections to considering the war neuroses a strictly medical problem at all.

In fact, much of the difference of opinion had to do with elements entirely removed from any objective study of the condition. Strangely enough, many physicians in contact with these cases spent more time and energy in trying to decide whether the soldier, a victim of war neuroses, was worth bothering with at all than in attempting to appreciate what it was that had happened to him. A possible explanation of this curious attitude might perhaps be found by subjecting those physicians themselves who held such curious unmedical views to processes of analysis used in studying the war neurosis soldier. It was, in a sense, the evidence of an unconscious overactivated fear that they, themselves, under proper conditions might very well develop all the symptoms against which they showed so unsympathetic and uninformed an attitude. The proof of this statement may be found in the fact that men who have been through the actual experiences of front line work learn to view the victim of war neuroses with a new understanding and insight. It is this tendency of defense by the exaggeration of a normal repulsion to evident weakness in another that establishes what seems to be one of the most fundamental facts in the war neuroses themselves—that is, a defensive purpose as part of the great system of physiologic conservation. There is found in presumably normal men, in this instance physicians, evidence of a

mechanism of this kind, focussing on an anticipated set of experiences. The identical mechanism must necessarily be put into action when the experiences are no longer merely anticipated but real.

CONCEPTION OF THE WAR NEUROSES AS A DEFENSE  
MECHANISM

The conception of the war neuroses as a defensive mechanism or as a part of a system of physiologic conservation may be approached with less difficulty if it is made clear just what is implied by those terms. It is necessary also to appreciate the fact that the defense meant here is not conscious, but automatic and probably altogether outside of volition. There exists in all living organisms, sets of factors which work toward the saving of those organisms from destruction. There exists likewise in each important function of that organism, a mechanism for preventing function from becoming excessive and preventing injury to it as a whole or to its respective elements. Living would be impossible if this did not exist. The protection may be purely automatic and adjustable to mechanical factors, as for instance the hypertrophy of the heart; it may be chemical as in the immunity defense, or it may be various combinations and mixtures in which polyglandular activities come into play, it may be physiologic in respect to functional adjustments and psychical when deeper and more intricate activities of consciousness are at work. The latter may be termed physiologic, but for convenience it is better to consider it a definite psychogenic mechanism.

This principle of organic defense appears to be a very fundamental thing touching on the very innermost principles of living things. Naturally this principle has long been recognized and, by whatever term it has been designated, it has been an admitted fact to be considered always in the attempts to understand the phenomena of life. When the mechanism of defense, whatever its nature is, becomes inactive or less efficient, the living organism may be said to approach destruction, or if it fails completely the organism dies. It is possible, perhaps, to divide the defense mechanism into two classes, one acting to prevent the mechanical using up of living tissue—the wear and tear of the machinery of life as it were—the other to resist and modify the exogenous factors of a destructive kind to which every living thing is ceaselessly exposed. It is obvious that even if no sharp line of demarkation can be said to separate these two, yet the adjustability of the defense shows, in either instance, a difference in the quality of promptness and speed with which it can be put into action. The mechanically incited defensive organization is apt to be slow and cumbersome, taking place gradually according to the progress which the changed conditions of the mechanism itself necessitates, while the

other must be capable of meeting quickly and decisively the immediacy of an oncoming event. Therefore, the latter type of defense must possess a certain power of selectibility or adaptability because events or experiences are in their very nature dissimilar and varied. This seems to be true of the neuroses in general, and of the war neuroses in particular. If they are studied from some such point of view as this they show the characteristics of an exquisitely adjustable and often complicated piece of psychical machinery, adequately and, in a sense, personally fulfilling the purpose of protecting the individual against reexperiencing a series of destructive events to which he has been recently exposed. The analogy between the organically inspired defense mechanism and those physiologically activated or sensitized, as some one has described them, probably goes no further than this, and the comparison has served its purpose if the fact has been made clear that the neuroses defensively considered are a part of a mechanism so fundamental for the preservation of life, as a physical phenomenon, that their existence cannot well be doubted. There is nothing new in this conception. Freud long ago, and others before him, had seen in the neuroses something more than a collection of symptoms simulating organic diseases. Many students of the neuroses have been impressed with the apparent needless over-emphasis of symptoms in face of slight degrees of possible determining factors, and they must have seen in this, or dimly felt at any rate, that some other incentive was at work than merely processes of reaction on the part of the organism. It was in this zone of over-response that the explanation was to be found.

With the appearance of Freud's *Abwehr-Neurosen* in the early nineties, the conception of the neuroses as defense mechanisms began to make slow headway among the neurologists. To many of them the rest of the freudian psychology was not convincing. That conception however, was so helpful and clarifying that it gained the support and belief of many to whom anything else coming from that school would not have been acceptable.

The war neuroses have given the opportunity to test out this aspect of the freudian psychology by furnishing thousands of cases in which well known and a more or less constant etiology were always to be found, and in which the resulting reactions might be studied divorced completely from the cloud of etiologic sexual entanglements which so confuse the attempt to understand the peace neuroses.

If this short exposition of the defensive quality of the neuroses has been sufficiently convincing to create at least a sympathetic attitude toward it, the way is prepared for a closer consideration of two essential preliminaries before the neuroses can be clinically considered.

One of these has to do with an attempt to differentiate between the neuroses and the psychoses; the other, with the attempt to define the war neuroses as definitely and clearly cut as possible. Closely associated with these two attempts will be an effort to place in its proper position in the structural formation of the neuroses the rôle of primitive instincts.

#### DEFINITION OF WAR NEUROSES

One of the confusing aspects of the war neuroses in the first few months of the war was the tendency on the part of many physicians in both the French and British armies to regard the neuroses as mental diseases. Many patients were sent home or to backward areas with the diagnosis of depression, mania, dementia praecox, etc., and found their way eventually into institutions for the treatment of the insane. This is mentioned not in the way of criticism at all, but because it will make clear, perhaps, that this question was presented very early. There comes almost immediately into the mind of any one having to do with large numbers of soldiers with war neuroses the same question: Are these things psychoses or not? Clinically, they are often similar to well recognized and conventional types of psychoses. Unlike them, however, they show a surprising quality of getting rapidly and unexpectedly well. The question, then, is: What is meant by a neurosis and how does it differ from a psychosis? The only feasible way to determine this question is to place the differences between these two terms side by side, and to arrive at a definition of the neuroses by excluding from them qualities which seem fundamentally included in the psychoses. In this way it is possible to accurately define neuroses in terms of the excluded pertinent factors in the psychoses.

With the end in view, then, of an attempt to define the neuroses with the direct purpose of giving to the war neuroses a special place, the following is set down for consideration.

As a preliminary point the psychoses which are here touched on are the so-called inorganic types. None of these due to organic changes, or defects in the brain, or to the results of toxic or chemical processes, are considered. This is not an arbitrary distinction, but one made necessary by the assumption which has been so often emphasized, that the neuroses are defensive mechanisms, demanding always as their first requisites a consciousness that can act in a normal manner.

The difference, then, between the psychoses so limited and the neuroses lies largely in the notion that in the psychoses there is a want of a primary and logical purpose. A psychosis in the long run always acts to the disadvantage of the individual, both in relation to his



immediate environment and to society. Its origin, therefore, must lie in processes of consciousness which are permanently abnormal, destructive and constantly departing from a normally acting intelligence. Sooner or later a psychosis brings the individual in conflict with himself, his class and society.

The neuroses, on the other hand, never do this, nor can they do it. For as their origin and purpose are fundamentally protective, a conflict leads to the enfeeblement and eventual disappearance of the individual out of his environment. The neuroses are, therefore, protective mechanisms which tend to guard the individual from the immediate event for which he lacks proper personal adaption. The psychoses, on the other hand, serve no protective purpose whether immediate or remote, but on the contrary tend logically to the destruction of the individual in the conflict of events. They are permanent deviations, progressive in type, which arise without set purpose, and are the consequences of abnormal processes in consciousness. They tend to the elimination not the saving of the individual. In the struggle with society it is generally the individual who succumbs, either as a living organism or as a member of a social order. The neuroses, on the other hand, are the products of an intelligence awake to the needs of the individual and are structures of compromise between him and society. They tend to shield him and so do harm to society. They arise in consciousness from fully realizable premises, but tend to become automatic and without the individual's awareness, so that he reacts to them instead of the things that he is cognizant of in his own make up.

It is to be noticed that in this definition of the neuroses there is no attempt to fix on an etiology. The causative factor of events is touched on, but it is given no specific meaning. In the war neuroses, on the other hand, there is the qualifying factor of war, and this definition to have any value for the present purpose must hook up with the ever-present set of circumstances associated with military activity in war time. This brings with it an important element scarcely hitherto touched on in this paper, and that is the instinct of self-preservation and its activating source—the emotion of fear.

#### THE RÔLE OF INSTINCT

No attempt will be made here to define instinct. Two of the instincts may be called primary, primitive or fundamental. These two are the instinct of self-preservation and propagation. They represent certain necessary qualities of life without which life would be impossible. That is, it could not continue. To be continuous it is essential that the individual should live at least long enough to propagate, in



this way preserving the quality of continuity. Neither of these two qualities is possible without some mechanism tending in the long run to preserve life as existent, and to prolong it beyond its individual expression. These two instincts might be termed essential because they are necessary parts of the phenomenon of living.

In the other instincts, and their number is as great or as little as is preferred, it is found that they do not represent these innate and essential qualities, but do represent certain tendencies or impulses which depend rather on racial or species experiences. These are the things that have in the long run acquired a certain positive value in the struggle both to prolong the life of the individual and to render as easy as possible the passing on of life beyond the individual. Such tendencies are probably acquired and inheritable. By repetition from one series of individuals to another they become dominant. The nervous mechanism by which they are set in action becomes by each successive wave of individuals more adapted and prepared for the reception of the sensory excitant, the emotional background and the motor outlet. In some such way they tend to develop into complicated reflexes, each one of them conditioned by a particular set of circumstances.

In the war there is the essential instinct of self-preservation. This is the instinct primarily involved. Many of the others play their part, but are secondary and unessential. In the war neuroses the motive is furnished by the presence in a very active and, to the individual, unusual way of the instinct of self-preservation. The war neuroses may be looked at, then, as an elaboration of this instinct carried out as primary instincts always are without the individual's will or knowledge. They are defensive, automatic adaptations on this basis because the individual has no longer the power of adapting himself to immediate condition and he surrenders himself to a more powerful defense that he himself can possibly, consciously, construct.

#### THE CLINICAL PROBLEM

With this conception of the neuroses in mind there remains to study them as they show themselves clinically in varied disease pictures, and to attempt to understand what these pictures mean and how they came about. The test of the accuracy of this conception is to be found in the light that it can throw on origins and mechanisms and the use that can be made of it in appreciating why the thing has happened. A further test will be shown if the facility by which symptoms can be treated and the patient restored to the condition he was in before is increased. The war neuroses show themselves clinically in a variety of confusing types. Classification seems almost

impossible because the same symptoms are represented by types that are obviously distinct. In a group of a hundred acute cases, for example, there will be many symptomatic types, frank hysterias, anxiety groups, pure sensory disassociation forms, individual over-reactions, concussion forms, episodal and transient mental states, etc. Two ways are open in facing so complex a clinical demonstration. The first is to regard classification as of little consequence, but merely to find some few labels grossly descriptive of large groups and then to think of them as a whole and approach the therapeutic task by some mass form of treatment. The other way is to attempt a grouping, not based on clinical appearances alone, but on mechanism and the most immediate of the etiologic factors concerned. The former method has been adopted by most of the English and French neurologists. It has a certain advantage, chiefly in the avoidance of intimate study of individual types, and in supplying a ready means of avoiding difficult and controversial questions in regard to terminology. For example, it would be perfectly feasible to say that all war neuroses belong to one of two groups — neurasthenia or hysteria — implying that those showing primary fatigue elements belong to the former, those showing paralyses, sensory anomalies, convulsions, etc., to the latter. A third group might be made up of the concussion types. Some of the very best therapeutic results have been obtained by those to whom a further effort seemed useless. It should by no means be inferred because no effort is made to classify or carefully group cases, that the work is unworthy of praise. At one time in the English service, in the forward areas at any rate, all cases of shell shock were called hysteria, and the Babinski conception was thought to be applicable and satisfactory. In the French literature little attention is paid to the study of intimate mechanisms, yet no one can say that in the later years of the war either of these nations failed to take care of its quota of war neuroses adequately.

It seemed, however, in our own experience, that in the long run the more minutely the cases were studied the more effective the therapeutic methods would become. The first and essential step was to disintegrate the mass into groups. The smaller groups then make an intensive study of mechanisms easier, forming by comparison with other groups a standard of measurement. Furthermore, the various groups which sprang up almost automatically as a result of this tendency to analyze the material became, as it were, centers about which clustered specially developed therapeutic methods, prognostic experiences, disability classification questions and characteristic sets of mechanisms. All of this lent to their study a surprisingly increased amount of interest. A common differential diagnostic language grew

up, at first limited to the staff at Base 117, which later spread to the forward areas and became, in a measure at any rate, the means by which men could converse or write to one another about their cases.

Therefore, the attempt to classify the war neuroses or group them seems to be justified by the use which was made of the grouping and by the impulse it gave to a closer scrutiny of individual cases as they fitted themselves into this or that class. It must be understood that a grouping of this kind is only of value if it fulfils the test of utility. If it does not, it deserves to be given up without further argument. That it did seem to stand this test, at least in the experience of Base 117, is the reason that it will be described in this paper.

Before venturing to classify these cases, or rather label them when grouped, a preliminary thing had to be done. This was to redefine such terms as had been used before and to define the terms that were new. This implied in some instances a rather new, or at least a novel point of view, and a departure from some of the cherished landmarks of our old neurology. Two factors necessarily influenced all the conceptions in classification. One was that the war neuroses were essentially a war-born condition, and that etiologic incidents were all colored by this fact. The other was the conception of the defensive or protective character of the neuroses frequently referred to in this paper. A classification which implies a theory may seem artificial and dogmatic and applicable only to a limited series of differing conditions. This and other objections more vital might be advanced. For example, this classification is confusing because three things are considered in the grouping and given unequal prominence: etiologic traumatic incidents, symptomatic expression, and what may appear at first sight to be an arbitrary selection of psychologic mechanisms.

It appears necessary to point out these defects for the reason that classifications are so often the objects of needless controversy and too much emphasis is often placed on them—an emphasis by no means justified in this instance when the modest origin of these attempts is considered. If this attempt at grouping, then, served the purpose of usefulness it might take its place as a pragmatic constituent of the work done at Base 117.

#### CLASSIFICATION

The following groups were recognized as diagnostic entities at Base 117:

- |                           |                                      |
|---------------------------|--------------------------------------|
| 1. Neurasthenia.          | 9. Timorousness or state of anxiety. |
| 2. Psychasthenia.         | 10. Concussion:                      |
| 3. Hypochondriasis.       | (a) Syndrome.                        |
| 4. Hysteria.              | (b) Neurosis.                        |
| 5. Anxiety neurosis.      | 11. Gas:                             |
| 6. Anticipation neurosis. | (a) Syndrome.                        |
| 7. Effort syndrome.       | (b) Neurosis.                        |
| 8. Exhaustion.            | 12. Malingering.                     |

The various incidents associated in the etiologic sequence of the war neuroses tend to separate themselves into three definite classes: (1) The individual himself from the point of view of his own nervous system; (2) factors which are preparatory of favoring—perhaps indirect would be a better term—and (3) the direct or energizing factor, the thing or things that render the soldier an immediate or potential victim of a war neurosis. In attempting to give due weight to these factors much controversial ground will have to be gone over and difference of opinion will be encountered every inch of the way. It is only fair to state that what is here set down is based on a sufficiently large material to afford numerous opportunities to test out and measure the accuracy of the conclusions arrived at. Considerably over 4,500 cases came under the observation of the author; some of these were intensely studied, some were observed as part of his duty as medical director, but all were seen one way or another.

#### NEUROPATHIC INHERITANCE

One of the most discussed questions and one to which too much emphasis has been given, has reference to the question of what has loosely been called neuropathic inheritance tendency or something equally uncertain. The reasoning ran something like this. No soldier who is not of a neuropathic type can develop war neurosis. The fact that he shows symptoms of this condition is an admitted proof that he belongs to this class. Thus having arrived at this conclusion all that remained was to find evidence supporting this contention from the patient's past history or the stock from which he came. In a very high percentage of cases sufficient data of this kind could be found. This was taken as proof of the contention.

By delimiting the things that could be fairly termed neuropathic and by studying the individual's personal and family history uninfluenced by his present condition, a different conclusion was reached. For example, a history of epilepsy in a cousin might be considered as an important neuropathic trait from the former point of view, while it would completely lose its significance in the latter. A series of soldiers not afflicted with war neuroses was studied from this point of view in the material in the B. E. F. Hospital to which the author was attached. Slightly under 2 per cent. might be classed as neuropathic, a similar series among patients with shell shock (this term is usual in the British service) showed something under 5 per cent. This discrepancy is easily accounted for by the tendency to scrutinize a bit more carefully the data in a war neurosis case than in any other. As the mass of material grew larger the proportion of neuropathic cases grew less and its percentage tended to decrease rather than to increase, but it never appeared to be much greater than 5 per cent., and never under about 2 per cent. Of course, this question cannot be



settled until the more exact methods used in the best eugenic studies are duplicated, and this was manifestly impossible under the conditions in France. Two facts seemed to come out of this attempt to give neuropathic inheritance its proper place in etiology. One was that, all things considered, the neuropathic soldier would react more quickly and more deeply to a set of traumatic incidents, and the other was that almost all uncured or incurable cases—the so-called D. classes of the disability board—were evident neuropaths, either coming from a stock touched with insanity, epilepsy, alcohol, etc., or showing in their personal history evidence of such influences. Whatever the final conclusion of the direct rôle of neuropathic inheritance may turn out to be in the cases of soldiers beyond the 2 to 5 per cent. mentioned, the frequency of neuropathic traits in the uncured appears to be definitely proved. Inasmuch as the grosser and more readily recognizable neuropathic types were supposed to be excluded from the American Army and particularly such contingents as were sent abroad, and that this Army was the only one to undergo such preliminary neurological sifting, there ought to be found a smaller incidence of neuropathic types in the neuroses of the A. E. F. than in any of the Allied armies. This may account for the small percentage that has been stated—though among some of the more enthusiastically inclined neuropathic statisticians, the percentage was found to be as high as in the unsifted armies of England and France.

Fear and fear reactions certainly cannot be set down as neuropathic traits, and as they are the most important energizing factors in the etiologic sequences of war neuroses, it follows that any soldier, neuropathic or not, may be viewed as a potential case of war neurosis. This, after all, seems to be the most illuminating point of view and by far the most useful, and as such it fits in with the conception advanced in this paper. As a possible predetermining influence in the series of incidents leading to the development of war neuroses in a soldier, neuropathic inheritance has some importance, but an importance completely overshadowed by the more active set of traumatically converging incidents, which will now be described.

#### PSYCHOLOGIC MECHANISM

In order that the mechanism of automatic defense may be set to work, the average soldier must undergo a series of events which tend to weaken what may be roughly and rather inexactlly termed his ordinary self-control. By this is meant that he must be put temporarily in a condition where his normal mechanism of inhibition is seriously weakened. By inhibition in this sense is meant the totality of his power to control the natural exhibition of the phenomena of



fear, terror, nervousness, horror, etc. To this must be added the positive factor which strengthens the inhibitory impulses — that military quality which keeps alive and ever present in consciousness the recently acquired traditions and customs of a soldier. This is an element of morale. The mental process by which this is accomplished is suppression or repression. Inhibition is merely a larger and more physiologic way of expressing it.

The important set of circumstances which tend to weaken this faculty are: (1) exhaustion; (2) fatigue — the more chronic phase of exhaustion, and then in succession sleeplessness, lack of food or water, worry, responsibility and incidents of a particular, horrifying or unaccustomed kind, loneliness, strangeness, ill-treatment, etc. The list of these incidents might be endlessly multiplied, but enough has been set down to indicate their character. The importance of incidents like those that have been mentioned and others of a similar kind lies in the fact that they tend, each of them or in combination, to weaken the individual and to prepare the way for the reception of the final traumatic incident. They create in the soldier, so to speak, a favoring terrain; they further tend to develop in him a soil of receptivity, in which or on which the neuroses given the proper setting can easily develop, become fixed and chronic. In opposition to these, the soldier, according to his peculiar personal make-up, struggles either forcibly or feebly according to the measure to which he has surrendered himself to his career as a soldier. Back of all this lies no doubt many an emotionally-tinged impulse, leading straight back to his former-nonmilitary existence. Among these may be mentioned the mass effects of discipline, or morale, the grip of idealism which led him to offer himself as a fighter, his experience with the German as an antagonist, the memory of slaughtered friends or comrades, his love for his officers, the honor and reputation of his regiment, and things of that sort; all of them or some of them are present in the make-up of every soldier. They form the counterflow against the on-rush of factors which center about the condition called fatigue or exhaustion. It is to be noted that in whatever stage of fatigue the soldier now happens to be, he is still in possession of consciousness and a knowledge of himself. In no way has he departed from the condition of a consciously controlled human being. No matter how feebly the inhibitory impulse is asserting itself, it is still to some degree active, and to that extent the soldier is aware of himself as a soldier, perfectly responsible and responsive to the demands of his position. It may be argued that in the extreme stages of fatigue, the condition of automatism may be reached, but even if this were so, its approach is too gradual to permit of the neurosis structure instinc-

tively fortified by the necessity of self-preservation, to take complete hold of him. At this stage there comes into play a very important and significant psychologic element in fatigue. This is a very unusual and possibly suddenly developed state of suggestibility. This extraordinary state of receptivity not only to outside things, but also to ideas, memories, and emotions of endogenous origin, form, perhaps, the most favoring circumstance for the development of the neurosis which at this moment is awaiting an opportunity to enmesh the individual in its defensive system.

From this point on two sets of things may happen. Both of them have a precipitating effect and both tend to act in a positive and dynamic fashion equally effective in the production of the first and necessary phase of a war neurosis. One set of incidents has to do, in a certain proportion of cases, with the purely mechanical results of a shell explosion in the immediate neighborhood of the soldier by which he is shocked to a greater or less degree, so that there is momentary loss of consciousness, or it may extend over some hours as the case may be. As a rule, he either falls or is thrown to the ground, or wanders about in a confused way, and immediately enters into a state in which conscious inhibition is for the time being totally in abeyance. The other set of incidents has to do, not with a mechanically working factor, but with the appearance on the scene of some sudden, unusual or terrifying experience which emotionally overloaded tends to produce exactly the same condition.

The question of concussion around which so much controversy has arisen was not an important cause of dispute in the early years of the war. Even as late as 1917 and up to June, 1918, the most common etiologic fact in a case of war neurosis was that of shell explosion and the resulting concussion, but as the fighting on the Western front began to open up the importance of this factor tended to lessen, though not enough to make it take a secondary place in the list of causative moments. In the earlier days of the war the explosive incident was often combined with a burial experience; that is, the soldier was not only thrown in the air but was covered over with trench debris of all kinds, the two forming a twin traumatic incident which often has important consequences in the symptomatic sequence which followed. In the A. E. F. experience burial incidents were rather infrequent, a fact which decreased by so much the emotionally laden incident, which later became one of the most important of the fixation mechanisms.

The very constant reports in a soldier's history, as given by himself, of a shell explosion experience led the B. E. F. medical service to inquire more exactly into its accuracy. For a time shell shock

could be diagnosed only if there was documented evidence by witnesses of a shell explosion near enough to a soldier to produce a concussion effect. In some instances the soldier's recollection of what happened was not supported by the reports that came from the front. How large the error finally turned out to be is not known to the writer, but that the doubt was sufficiently important to warrant the effort of investigation is of importance here. No attempt as far as is known has been made in the A. E. F. to obtain exact statistics on this subject, and all that can be relied on is the account given by the soldier as far as he can remember, and on the symptomatic sequence of events which he presents. These are, as a rule, unmistakable and can scarcely be imagined by the average soldier. Whatever the percentage of shell concussion experiences in cases of war neuroses may be, it still remains, in a large series of cases, the most important of the immediately working traumatic incidents. It was so important a factor that at one time concussion and its resultant neuroses became a very important, perhaps, all things considered, the most important group in the entire classification from a percentage point of view.

Whatever the immediate factor may be, a period of unconsciousness, confusion or a dazed condition appears to be one of the most significant and almost necessary preliminary states favoring the development of a neurosis. Such a condition offers to the protective mechanism the opportunity to work, unaffected by the ordinary control of the touch with reality, which is implied when consciousness remains undisturbed. That a neurosis can develop without an intermediary state is of course true, but in these instances the mechanism at work is of a much slower and more complicated kind leading to approximately the identical condition through endogenous processes largely activated by emotional hyperreactions, breaking through consciously acting repression.

Looking at the thing as a process, and nothing else, there is evidently a state reached by the soldier going into a neurosis when, for the time being, his conscious control is weakened or lost, and at that period the instinctive reactions take possession of him, and uncontrolled by anything that he can at that moment interpose to counteract it, opens the way for the self-preservation instinct to obtain its fullest influence. At any rate, he remains under its control until one of two things happens. One leads back directly to the restoration of himself in his soldier capacity, in which instance no neurosis develops; the other, further and further away from his normal soldier self into something totally unlike and alien to the thing that he was, and then he begins to show one of the many types of the war neurosis.

In the course of this process another important element in the mechanism comes into play, especially during the period of transportation to a hospital and in the early days of the soldier's stay there. The process by which the initial symptoms become either temporarily fixed or tend to further elaboration has been described by various terms. None of them are, however, very satisfying. What happens is that there is given an opportunity for more complete concentration and introspection so that the individual removed from contact with his accustomed environment and away from the external influences of camp, line and military discipline, easily surrenders himself to his neurosis, which automatically tends to further elaboration and intensifications of symptoms. If this is not counteracted by skillfully planned medical intervention, intensive, and above all promptly put into effect, the war neurosis subject falls under the complete sway of his neurosis and the picture becomes completely that of a well developed and chronic type. That there is more at work in this stage than pure automatism and unconscious impulses must be admitted. That there gradually develops a fairly active desire not to get well, but to remain in the apparently safe grip of the neurosis instead of facing a return to conditions which lead to its production seems also evident. There is also here seen the beginnings of another process—that is, a struggle between the innate desire to return as a soldier and the automatic persistence of the preservative tendency previously alluded to. Cases left untreated, neglected, or contemptuously handled rapidly develop into this state, and as a result form the most difficult subjects for subsequent treatment.

There is a group of cases to which much that has been described above does not apply. It is mentioned here because it occurs in a condition very largely met with in the officer class and which may or may not have as an etiologic factor the acute traumatic incidents seen so frequently in the soldier types. The anxiety neurosis has a mechanism which is more complicated and in which the defensive element is obscured by the presence of an intense and persistent conflict. This conflict has its origin in the necessity, which an officer at all times is conscious of, to conceal from the men under him and from himself too, every evidence of emotional stress he may be passing through. This he does by the use of repression. The repressed material of his experiences, notably those in which emotional loading is strongly present, activate the conflict between his desire to maintain and follow the tradition and training of an officer and the strongly entrenched but completely unacknowledged instinct to save himself. The essential difference between his reaction to the sequence of traumatizing events, just described, and that existing in the case of the soldier, lies chiefly



in the fact that there is an ethical element at work which intensifies the conflict and causes him, in many instances, a great degree of mental distress, suffering and self-accusation. This produces the state of anxiousness which is often the only and sometimes the chief evidence, externally at least, of his neurosis.

It is not to be inferred from this that only the officer class can be afflicted with this type of neuroses. Any soldier, especially one of some education or in whom there exists a well developed ethical sense capable of introspective attention, may show this type of neurosis. Indeed, in the A. E. F. there was a much larger percentage of soldiers with this type of neuroses than was found in the B. E. F., due no doubt to the generally higher degree of education and selection made possible by the larger man-power available.

The anxiety type of neurosis presents a much more highly developed, pure, psychologic defense than the other forms. Its relation to physical factors is often much more difficult to demonstrate. In fact, it is often found developing after a rather long sequence of psychically acting traumas showing markedly insidious progress and evidently originating from insignificant and not easily demonstrable beginnings. Its defensive character is chiefly in the fact that it renders officers incapable of positive action, reducing them to a state of neutrality. In this condition he becomes, one might almost say, the prisoner of his conflict, and remains inert, without energy, without initiative, controlled almost wholly by the emotional stress engendered by the conflict going on within him. He is frequently unaware that such a conflict is present, the repressing mechanism working automatically to keep out of his waking consciousness all evidence of a thing of this sort. What he is aware of, and that very acutely, is his own mental distress and the physical expression of the emotional strain he is under. These external signs of fear, worry, etc., are dissociated in his own consciousness from the sources to which they owe their origin, and he is thus as much a puzzle and mystery to himself as he is often to the neurologist under whose care he may happen to be.

Several bits of qualification must be added to much of what has been written in this attempt to state the clinical problem of the neuroses from the point of view of its underlying mechanisms. It is necessary to appreciate the fact that in trying to trace the sequence of happenings which a soldier passes through on his way to a neurosis, an average of such experiences was recorded, something that might be accepted as a plan of a physiologic experiment if the soldier could be made into a laboratory problem. There is no thought of making this entirely applicable to every case of war neuroses, or, in fact, is it certain that any one ever passes through just the things that were



described. Of all things in the world the war neurosis lends itself least to dogmatic statements, but what has been set down appears to be a reasonable explanation based on an analysis of many hundreds of cases.

It may seem curious to use the possessive in speaking about the neurosis. The expression "his neurosis," has been used frequently in this paper. The purpose of this was to hint at the very personal character of these defense systems, and any serious study of such cases will show the interesting fact that to each war neurosis subject the symptoms do become personalized, unique and individual. Thus in attempting to describe them, expressions having the touch of ownership, appear to be warranted.

The clinical problem of war neuroses, then, may be summarized in some such way as this: There is a set of determining factors sensitizing the individual to the one or set of direct causative incidents. These, as a whole, are capable of being set down in the order of their assumed importance. The immediately determining factor has a definite traumatic quality, either mechanical, as in the case of shell explosions, or emotionally directive in the case of unusual or terrifying experiences. A certain degree of initial disturbance of consciousness appears to be either necessary or a very favoring circumstance for the development of the neurosis structure itself. The disturbance may be anything from a slightly dazed condition, associated with some degree of confusion, to complete loss of consciousness lasting several hours. Associated with the disturbance of consciousness there develops some degree of automatism, or a stage in which conscious inhibition is so lost or weakened that the individual becomes a primitive organism reacting to the primitive processes of instincts. In this state the instinct of self-preservation asserts itself. Instead of instinctive flight or concealment taking place, a manifestly impossible condition in most instance, there develops the manifestation of various forms of the neuroses which replace them. These take such form as may be modified by the peculiar circumstances in which the individual finds himself at that time and also according to his make-up. From the temporary fixation of symptoms the rest of the clinical manifestations of the neuroses tend to unroll themselves influenced by the peculiar mechanism which was then set in action. The neurosis tends to elaborate, become fixed and stereotyped after the initial stage according to the individual experience of the soldier, his surroundings, the kind of hospital he may be in, the character of his medical treatment, the attitude of his nurses and doctors toward him and other circumstances of a similar kind. At first the neurosis is entirely automatic, the product of a mechanism entirely out of the control of

the individual. Later, there enters into the problem some measure of responsibility for the further maintenance of the neuroses. At this place in its development a cure must be effected if the patient is to be restored to his former condition.

As was previously stated, the attempt to classify such cases as came to Base Hospital 117, and their number amounted to 3,000 cases, was made for the purpose of so grouping them that more exact study would be possible, and that the mechanism underlying their production could be more effectively inquired into preparatory to a more direct method of treating them. It was apparent almost from the start that there were cases that seemed to correspond almost exactly to types met with in civilian neuroses and to these the terms commonly used there could be applied.

What appeared to be necessary, however, was a redefinition to meet the conditions which the stress and strain of war implied so that the designation war neuroses might be justified.

#### NEURASTHENIA

There was a group of cases in which the chief evidence of disease was a very evident and intense condition of fatigue, the chief neurosis element of which was a marked subjective sensation of tiredness. Fatigue was an essential accompaniment to all muscular and mental effort as it was to all special sense activities. In such cases it was possible to demonstrate the presence of a fatigue reaction, which can briefly be described as an over-response to a minimal stimulus, or rather an over-effect to the resultant of a minimal stimulus. To such cases it seemed that the designation neurasthenia might be given. In this group, a very small one by the way, all the presenting symptoms were interpreted and analyzed as depending on the factor of fatigue, and this factor was further amplified by its subjective incidence. In other words, the primary experience with an intensely fatiguing series of incidents was carried over into the neuroses as a fixed and powerfully acting preventive toward any moderate muscular or mental effort. The emotional background secondarily produced was that of a state of simple depression with a concomitant factor of irritability.

The protective quality of a state such as this is clearly evident and needs no further emphasis. Such patients presented all the symptomatic evidences of a typical neurasthenic of civilian life, with this difference—they did not show the physical appearances so commonly met with in the usual neurasthenic types. When they did it was certain they were not war neuroses alone, but the development of a war neurosis on a condition that had existed prior to enlistment. Two types could then be recognized: (1) a neurasthenic differing in no

important way from the neurasthenic of civil life, and (2) an acute acquired neurasthenia—that is, a definite clinical variety of war neurosis. The distinction became the more obvious when it was noted that the acute cases presented few if any of the organic characteristics of the old neurasthenia, very few of the vasomotor disturbances such as sleeplessness, cardiac irritability, etc. Some of the extreme cases eventually did, but as a rule the evidence of neurasthenia was centered rather about the subjective sensation and its controlling power on the patient's activities than on the physical reaction due to disturbances of an internal kind.

What appeared to determine the presence of the neurasthenic type of war neurosis was rather the effect of a previous state of exhaustion, an acute experience which led to its further elaboration as a neurosis. That out of this could and did develop the typical neurasthenia was likewise true. Of all types of neuroses, perhaps the neurasthenia cases gave the poorest prognosis and resisted treatment most stubbornly. The absence of previous symptoms of neurasthenia in many of these cases except the congenital type, led to the attempt to place them in a special class and very quickly they came to be recognized as characteristic but not common clinical pictures. Another part of this picture was the fact that there was nothing mysterious to the patient about his symptoms, their cause or their significance. No conflict of any kind seemed to develop. Its mechanism was automatic but wholly and completely conscious.

#### PSYCHASTHENIA

The second group which early differentiated themselves were cases in which doubt was a prominent symptom. In such instances there is little evidence of fatigue, or none at all after a short period of rest, or, indeed, without it. Such patients were capable of considerable mental and physical effort, but they complained chiefly of doubt, hesitation, and an almost complete incapacity of choice. To this group, not a very large one, the term psychasthenia was given, chiefly because the symptoms corresponded accurately to the psychasthenic condition of civilian neuroses. Here two types began to show themselves; one, the typical psychasthenia of other days—the congenital scrupulous type, the exaggerator of small differences, the individual incapable of making decisions owing to the conflict of differences; fear as a consequence of choice preventing decision. The type is too well known to warrant any further description in this place. The other was an acquired state similar to this without a previous history of this kind.

If the condition of psychasthenia is reduced to its simplest expression, incapacity of the function of choice appears to be its primary

departure from the normal. It is the fear of the consequence of choice through experiences or through the anticipation of what the choice may bring about, that creates the static condition which is the chief characteristic of the psychasthenic's attitude toward events which tend to focus on him.

The term in Janet's sense seems to have too broad an application for the type which develops among the war neuroses. Here it is seen more as an evidence of the peculiar twist which the neurosis in its defensive adaptation causes. Perhaps, as is so often the case, the type that the neurosis finally develops into depends on some congenital peculiarity of the individual or on some experiences in his past life, which are awakened and are set again into activity by the more recent emotionally-tinged traumatic incidents. An attempt to connect up the acute psychasthenic symptoms in war neuroses with events long past and forgotten with the purpose of proving this point was not successful. This was done with a small group of non-coms, sergeant-majors in the B. E. F. No tangible connection was found, as these men particularly were apparently of the most normal antecedents, and men to whom, at least before they became subjects of war neuroses, decision and choice were second nature. Strangely enough in the B. E. F. this type of man was found frequently belonging in this group. Indeed, they were the professional soldier class, men with years of service who came to France in the early months of the war and some of whom had seen almost four years of fighting. The group stood out with great clearness chiefly on account of the type of soldier which belonged to it and because there was an almost total absence of all other traumatic disturbances; it was significant, also, because fatigue in the sense of the previous description appeared to be almost totally lacking.

These patients were puzzled, not because they had any doubt in their own minds as to the thing that had happened to them, but because they could not understand why it had happened. Here again as in the neurasthenia group the process seemed to play itself out in active consciousness, the patient being perfectly aware of his condition and perfectly able to tell what it was that was disabling him. There was no evidence of a dissociation process, and no intermediary mechanism was necessary to bring all the facts of his condition to the attention of either the physician or himself. In this instance, likewise, the process was an entirely conscious one, open to the fullest inquiry, needing no method of associative analysis either in treatment or diagnosis.



## HYPOCHONDRIASIS

The next group is the third of the consciously produced neuroses, and to this the term hypochondriasis was given because it so exactly fulfilled the condition on which such a diagnosis would have been made in pre-war neuroses. This group was also a small one, perhaps the smallest percentage of incidence in any of the groups. Indeed, it is questionable whether a pure hypochondriasis can develop *de novo* from war experiences alone. In almost all cases in which this diagnosis was made, a previous history of this condition could be discovered. The pre-war conception held by the writer of the mechanism of this disease seemed in every way applicable to the same kind of thing met with in war neuroses. Hypochondriasis is perhaps the most perfect type of a defensive neurosis because it touches a fundamental and primitive tendency found among all peoples, that is, the automatic release from duty, responsibility and work in the presence of disability or sickness.

The mechanism consists of two intimately related things. First, there is evidently present in these patients an abnormally low level to receptive impressions from the external world; that is, the skin and special sense mechanisms are capable of transmitting a greater bulk and variety of sensory impressions and having them perceived as impressions, than is found among normal individuals. This lowering of the sensory level is also found in the receptive mechanism having to do with sensations arising from within the body, probably through the autonomic system. This intensification of the sensory margin has its chief effect in developing an increased capacity of attention—that is, the hypochondriacal individual has not only a capacity to become aware of a flood of unusual and strange sensations arising externally and internally, but has his capacity of attention sharpened to their perception when received. By that very sharpening of attention the facility of final interpretation of such sensations is increased. He thus becomes aware of a constant inrush of sensory impressions which tend more and more to occupy his field of consciousness. This mass of wrongly interpreted and wholly new and strange sensations is the crude material out of which the neurosis is fabricated. This fabrication takes on the picture of disease which becomes more and more definitely personalized as the process goes on. Naturally the experience with or knowledge of disease together with the suggestions obtained from observation, rumor and surroundings influence the variety and dramatic quality of the particular disease in question. The collection of ideas concerning disease tends to occupy more and more the patient's field of active consciousness so that he lives practically controlled by them. When he responds to a constellation of this kind



more than he can possibly do to the world about him, when his mental life spins eternally about this or that picture of disease, which at all times fills his field of consciousness, the complete picture of hypochondriasis may be said to have developed.

This completed picture should be sharply differentiated from what may be called a hypochondriacal attitude. This latter is very common among soldiers, but only as a temporary state which quickly disappears with rest and improvement. The true case of hypochondriasis shows no change under either condition and apparently is uninfluenced by treatment of any kind. It has been said that true hypochondriasis is rarely found as an acute or acquired type of the war neuroses. This is in a measure true, but it is quite possible for a clinical state closely resembling this to develop on the foundation of a slight and often insignificant or passing trauma or condition, insignificant in proportion to the more dramatic kinds of traumas so frequently mentioned in this paper. For example, it was sometimes found that a soldier who had been previously operated on for an appendicitis would, under the influence of a series of traumatizing events, develop a neurosis of this hypochondriacal type which appeared to center about the operation or the scar remaining as an evidence of it. Previous to such an experience the whole appendicitis incident has been completely forgotten, but suddenly there developed a complete picture of postoperative adhesions, pains and a widespread area of scar tenderness. From such a beginning the whole picture tended to spread, involving neighboring organs until the patient was entirely in the grip of an ever-spreading collection of disease ideas. It is of some significance that in such cases the therapeutic outlook was more encouraging than in the type previously mentioned.

It is necessary to emphasize once more that the hypochondriacal tendency is often found entirely dissociated from the true neurosis, but even in its partly developed form, the essential mechanism as described could easily be demonstrated; that is, the increased capacity for automatic attention and the lowered threshold of sensory receptivity. In hypochondriasis, again, the neurosis is consciously determined and thus belongs to the group of which neurasthenia and psychasthenia are members. These three, then, form the first subdivision that is consciously originating neuroses. Again, this does not at all imply that they are either willfully or designedly produced, but that they play themselves out in the upper zones of consciousness and awareness.

#### HYSTERIA

By far the most striking of all the war neuroses, clinically at any rate, are the hysterias, as the anxiety neuroses are the most subtle and

intangible. These two are taken together because both represent unconsciously producted neuroses, and both are types of a dissociation process. The one shows itself by dissociation of motor, sensory, special sense functions, and in some instances of the function of memory; the other, by purely psychical forms. The one—hysteria—showing no evidence of conflict; the other—anxiety neurosis—arising out of a conflict with a strong moral or ethical component. Hysteria was regarded as being, in a sense, a type of cortical dissociation, very often almost anatomic in its demonstration; the other has to do with much deeper and more illusive qualities of consciousness touching more closely on the factors concerned in personality. Another striking difference lies in the reaction to therapy. Hysteria was the most easily cured of all the neuroses, anxiety the most difficult. A curious and interesting point of difference was found in the fact that in hysteria there was little relation to pre-war conditions or experiences. In the anxiety neurosis analysis often led back directly to pre-war conflicts in which the same or similar elements could be demonstrated. They did not necessarily give rise to a neurosis then because the repressive mechanism sufficed to tide the patient over, but it was often easy to appreciate how definitely the stage was set, as it were, by virtue of the patient's former experience with conflict processes of a less intense form.

Hysteria is then to be considered as a type of war neuroses caused by the mechanism of dissociation, by which functional activity either in its motor, sensory or psychical capacity is blocked from consciousness and conscious control. If an organ of special sense is involved the dissociation process tends to separate out one or more of its coordinating functions from the control of the complete mechanism. The part or parts in either instance divorced from consciousness can maintain itself in one of three ways. It can cease to act at all; it can act abnormally—that is, in a qualitative sense, or it can hyperact—that is, in a quantitative sense. In other words, there can be paralysis, uncoordinated or perverse forms of action or convulsive-like movement. This same thing is found naturally in the sensory and special sense fields. The dissociation process is most frequently set in activity by a somewhat sudden emotional or physical shock and, if in the latter instance, the precipitating factor is most often the effect of a shell explosion or some type of trauma associated with some degree of violence. The type of reaction in hysteria both in respect to localization and function bears a definite relation to the local effect of the trauma. Blindness is often the result of the acute blinding sensation of an explosion, deafness due to the momentary loss of hearing. For the same reason, sensory disturbances are due to numb-

ing of areas of skin following disturbance of atmospheric pressure in the zone of an exploding shell, etc. The emotional precipitating factors have the same curious localizing tendency, with the exception that here suggestion or imitation seem to show a more active influence. It is necessary to point out that in hysteria, particularly the acutely established types, show less clearly the characteristic protective defense than in some other types of neuroses, and it must be admitted that in some instances it is only after the primary disturbance has manifested itself, whatever its nature may be, that the defensive mechanism is set to work and then chiefly in the direction of fixing it and making it more permanent.

A sudden shock having a positive degree of physical incidence may throw out of activity a certain function or a part of it, certainly too rapidly for any kind of psychical mechanism to be set going. In such instances the instinctive action of self-preservation arises later automatically making that loss of function fixed, thus establishing it as a neurosis of the war type.

Such a conception of hysteria is a departure from the usual thinking on this subject and naturally differs essentially from the theory of Babinski so much in vogue in the literature on war neuroses, but it seems impossible to escape from some notion of this sort, in the face of the almost instant appearance of symptoms after an explosion incident and the tendency to fixation and the elaboration of the symptoms following the slow return of consciousness. Whatever rôle suggestion plays, it surely can be regarded as only part of a much more complicated mechanism and not the only factor at work. One of the most interesting phases of hysteria in its war neuroses coloring is the amnesias, and these may be regarded as pure types of dissociation in the purely psychical sphere, and they obey apparently the same sequential rule as the cruder forms of response. The single and most reliable diagnostic evidence of hysteria is found in the presence of the dissociation process. When the symptom is capable of being described as due to that, and if it meets the necessary requirements of an hysterical symptom, not necessary to mention here, the diagnosis of one of the many forms of hysteria found in the war neuroses can be made.

Another characteristic of an hysterical symptom is that in its disappearance it may pass through any one or a combination of the three forms which have been described. Complete paralysis often recovering through the phases of tremors, exaggerated movements, etc., aphonias recovering through the phase of stammering, etc. The synthesis with consciousness very often is not direct and immediate, but indirect and incomplete.

## ANXIETY NEUROSES

It is in the anxiety neuroses that the most complete example of psychical dissociation is met with—that is, a dissociation unaccompanied by anatomically expressed loss of function. It has to do with a more general process and reaches down more deeply into personality than the more superficially located mechanism seen in hysteria. Something of the etiology and the primary reaction have already been touched on. There remains to describe progress and final clinical results. The subject of an anxiety neurosis must be thought of as an individual in whom the repression faculty is well developed. This may come about either as a personal characteristic, or it may be due to the position of authority due to his military position. Naturally the officer falls most easily into this class, and it is in the officer class that the majority of instances of anxiety neuroses are found. Next would come certain types of the noncommissioned officers, chiefly such as have received their commissions recently, and then soldiers who by virtue of education and the development of higher standards are inclined to react easily to ethical considerations. While this may be the general type which develops this form of neurosis, there are always found exceptions which apparently do not fit into the conditions as set down. Such exceptions are probably insufficiently studied or understood.

In the typical case and for the purposes and necessary limits of this paper only such can be considered, there is present, almost from the beginning, the essential elements of the mechanism of an anxiety neurosis. These are conflict, repression, not only of the memory of the experiences themselves, but also of the expression of the emotional reaction associated with them, and a certain degree of what may be called the ethical point of view in the presence of the antagonism between what is regarded as the right thing to do and the natural innate tendency toward self-preservation. These, of course, form only the basic groundwork of the process, indicating enough of the mechanism to warrant grouping these cases in a class by themselves.

In almost all instances an officer very early in his career, very likely even in the training camp, feels the necessity of repressing his dislike or objections to discipline, obedience, authority and many of the other essential phases of military life. His repressive mechanism not only has to do with the ideas themselves, but also with the external evidence of his attitude toward them; that is, his conduct must depart in no way from the correct military form. For these, and indeed for most of the experiences associated with actual combat duty, the repressive function is amply sufficient to keep the officer from ever approaching the territory of the neuroses.



The repression faculty has a well known tendency to become automatic and to act entirely without the intention of the individual. As the officer advances in his training, and as military life grips him more and more intensely, and as military discipline forms him into a silent part of the big army machine, he is less and less in need of any active manifestation on his part of this faculty of repression which was so much a part of the mental discipline of the earlier days of his training. It must not be forgotten that in the A. E. F. the professional class of officers was necessarily a small one and that most of the non-professional officers were taken out of civilian pursuits of various kinds in which no trace of military atmosphere and certainly none of active combatant duty were to be found. Therefore, there was no important set of military, or officer traditions to which the future officer had long ago accustomed himself. In England, of course, there was, and there is no doubt that this had a definite influence on the number of anxiety neuroses among them.

Therefore, it should be appreciated that in our Army the traditions of conduct in general and particularly those associated with active military life had been very recently acquired, so recently that they were only superficially grafted on the officer's personality. There was need, then, to exercise, whether consciously or not, that form of inhibition called repression in order to maintain such traditions under circumstances of difficulty. This was especially necessary when the officer met front line conditions for the first time, when he had not only himself to keep in hand, but also the added responsibility of men under him for whose fortunes in the stress of trench or open warfare he held himself in a measure responsible. In addition to this he realized that the technical side of his profession, a most difficult and intricate thing, was also but recently and often most laboriously acquired and had now to withstand the actual and often bitter test of real combatant conditions. Notwithstanding these heavy burdens, very few officers, it must be acknowledged, did even, under the adverse conditions associated with front line conditions, develop a neurosis. Those who did, had to face peculiar sets of circumstances which tended to break down the inhibitory processes which held them together in their capacity as leaders of men. Under the strain of fatigue, exhaustion, worry and some of the many incidents that have been before alluded to and as a result of shell explosion with a concussion sequence, the faculty of conscious inhibition was temporarily lost and the officer acted for the time being as a primitive instinctive piece of human machinery and during the period of semi-automatism, confusion or haze, the beginning of the neurosis of the anxiety type was laid. If some of these things did not happen in an acute manner, then a series



of smaller and less important incidents brought the officer in exactly the same condition.

From this time on, the conflict began to assert itself coupled with the dormant repressive tendencies, which again came into activity as the reality of the situation became more and more apparent. It is this antagonistic relation of conflict to repression that tends toward the separation of emotion from experience. This supplies the mechanism of dissociation alluded to before. There results then the clinical picture of a state of intense anxiety with the external evidences in the way of facial expression, depression, apathy, anxiety, loss of sleep, dreams and even the objective appearance of fear, tremor, rapid pulse, vasomotor reactions, in the face of the complete unawareness and lack of understanding on the part of the patient, of what really is at the basis of his discomfort.

The battle experiences repressed, and in a sense partially forgotten, tend to express themselves by freeing their emotional content or by spinning themselves out in dramatic and terrifying dreams. There is present, then, the evidence of fear and terror without being related to either actual experiences themselves or even to the actual memories of such experiences. In this state there develops a series of conflicts which must be regarded as being hardly conscious in some instances and wholly so in others. These seem to have been the more usual. (1) The conflict between the desire to go back to the front and the negative desire or wish for self-preservation. (2) The conflict arising between tradition and training of an officer and the desire to escape front line conditions. (3) The conflict between the desire to avoid the dangers and discomforts of the front, and previous ideas of duty, valor, etc., and family, social, personal and class standards. (4) Conflict between the desire to escape and the feeling of inadequacy, in a military sense, of the responsibility of an officer in command of men. (5) Conflict between the impulse to go forward and the wish, expressed or not, to go back to former conditions in the United States. (6) Conflicts which have reference to events or similar types of conflict in pre-war experience.

Naturally there are many other kinds of conflicts, but these were so common in the cases seen in Base Hospital 117, that some of them were predicted in certain individuals and were actually found to be present.

Enough has been said of anxiety neuroses to indicate at least what is believed to be its fundamental mechanism, and to establish the fact that such a group of cases exists characterized by this mechanism. Less space will be given to the other groups because their mechanism is less individual and the types much less sharply differentiated, and

because more and more they represent direct etiologic and symptom-ological types of classification.

#### ANTICIPATION NEUROSES

The anticipation neuroses were so named because they represented neuroses reactions, not to actual experiences in battle, but to the anticipation of such experiences. The neuroses, therefore, acted not as protections against the repetition of events already lived through, but as protection against initially experiencing them. As a whole, they probably were patients who had shown symptoms of the neuroses in training camps at home, but the manifestation of which had not completely developed. On the way over or after they reached the concentration camps in France, the symptoms bloomed out again, and under the spur of immediacy rapidly took on the characteristics of a well defined neurosis picture. The anticipation group was never a very large one and rapidly declined after active fighting began. They formed less than 10 per cent. of the total material, evidently most of them were excluded by the neurological examinations made in the home training camps. Any of the clinical types of neurosis could be found in the anticipation group. This appeared to show that the memory of a past experience, imitation, suggestion, rumor—if emotionally intensified sufficiently—could, in given instances, arouse the defensive instincts to take the form of a neurosis, in the presence of a sufficient degree of receptivity and expectancy on the part of the individual.

The anticipation neuroses are not war neuroses in the narrow meaning of the term, but it was found necessary to include in a classification and to place in it such cases as had never been at the front, as well as a few patients who developed the attitude of anticipation toward re-experiencing former experiences. They reacted similarly to the group for whom the anticipation neuroses was at first devised.

#### EXHAUSTION

Exhaustion has its place in a classification of war neuroses because it connotes defense of a chemical or polyglandular kind. These patients came into the hospital in some numbers at first, but with the establishment of the forward area hospitals fewer were seen. They represented a large percentage of the material seen in the *triages* and a considerable number of those seen in the advanced hospitals. In the earlier months of fighting they were often mistaken for and designated as war neuroses. As forming the foundation on which the neurasthenia type of war neurosis often developed, they deserve some mention here.

## EFFORT SYNDROME

Very little will be said about the effort syndrome in this place. So much has been written about this condition, and there is still so much controversy on the subject that nothing can be added toward clearing it up from the point of view of its place in a list of war neuroses types. It was common enough in the material at Base Hospital 117 and formed so distinct a picture that it was one of the most easily classified. From the point of view of its defensive quality it is a typical neurosis, associated with the exhaustion types, but was a more definite localizing quality. It frequently followed gas poisoning, being the most persistent perhaps of its after effects. Its close association with emotion and the emotional reactions of the cardiac and respiratory functions seem to justify its position among groups of a functional defense system. Clinically, it is too well known to describe here, and it is mentioned because mechanistically considered it ought to have a place in any classification of the neuroses.

## STATE OF ANXIETY

Timorousness, or a state of anxiety, was a term given to a small group of individuals who frankly admitted that they were afraid to face conditions at the front, and deliberately gave way to this fear, refusing to accept or develop any compromise between themselves and what they had to do as soldiers. These are the true and only types of cowards. In them no repression of the kind mentioned here exists. This is not a neurosis, of course, as the whole mechanism is entirely too open and frank. At first sight such cases ought to be dealt with outside of a hospital, but in the case of a soldier the condition was so strange and departed so much from the usual conduct of a soldier that such an individual was not considered normal enough to be handled from the military side alone. They would belong probably in the same class as the conscientious objectors, the difference being in respect to the kind of thing that interfered with their willingness to act the part of a soldier.

## GAS AND CONCUSSION

Under gas and concussion were included cases in which the primary symptoms of a concussion or gas experience were elaborated into the structure of a neurosis by the mechanism of fixation and defense. In the concussion neurosis the headache, vertigo, amnesia, temporary blindness, instead of passing away in a few days, as they normally do, begin after a comparatively free interval to become apparent again, with a definite degree of persistence and exaggeration

which had all the characteristics of a definite neurosis. In the gas neuroses the hoarseness, difficulty in breathing, pain in swallowing or talking, pressure sensation in the chest, dyspnea, etc., show exactly the same tendency until there developed a chronic picture of gas poisoning long after the acute symptoms had any right to be present. In gas, too, the actual pain of a skin burn persisted as a widely spread burning and paresthesia, long after the primary burn had healed, and all trace of it had completely disappeared. The syndrome of both of these types were included, because at times such patients were sent down to the hospital either through a mistake in diagnosis or on account of transportation necessities.

#### MALINGERING

Malingering is of course not a neurosis and it is included in the classification in order to take care of all possible types of cases. No diagnosis of malingering alone was made, chiefly because this has become largely a military and not a medical question. Unqualified and complete malingering was so rare that it was almost negligible. The classification or grouping has shown that the different types depend rather on certain sets of distinctive mechanisms and on certain almost specific traumatizing experiences than on symptomatology or on the final clinical picture. It is therefore necessary now to describe some of the more general symptoms common to many of these types and then to touch on some of the more general of the mechanisms.

Three are selected for description under the latter head, noting (1) what may be called by analogy with general medical description—the reactions of the organism as a whole; (2) the fixation process, especially in its initial stage, and (3) the convalescent conflict.

There are certain symptomatic reactions of the organism to emotionally effective traumas which represent its protective response as a whole and furnish the symptomatic background of the neurosis. As has been shown such symptoms are capable of elaboration, fixation and stereotypy according to the type of mechanism set in activity. For this reason some or all of those about to be mentioned may be found in any of the groups which have just been described.\* They may be regarded either as instantaneous reactions taking place at the moment of traumatic impact, or arising afterward as a result of the emotional responses accompanying the traumatizing incident. These are, in the main, primary fear reactions, such as tremor, dyspnea,

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\*No clinical description of the war neuroses will be attempted in this paper, chiefly because it has been admirably done, especially by Babinski, by many English writers, by Macurdy in "The Anxiety Neuroses of Officers," and by many others, too numerous to mention.



tachycardia, sweating, sense of muscular weakness, etc., and the resultant condition of headache, restlessness and insomnia. All of these may be regarded as vasomotor in origin and purely physiologic in expression. They appear to be so closely associated with hyper-emotional states seen in other than war experiences that they must be looked on as very general types of reaction with no specific war incidence at all. For this reason they are found as a kind of symptomatic background to almost all of the severer types of neuroses. Over 70 per cent. of the 1,500 cases seen in the B. E. F. service showed headache, and considerably more than one-half had insomnia. In most of the latter the insomnia was of brief duration, the headache was often very persistent. The headache in cases of concussion is somewhat different approaching closer to a specific symptom. Even in the development of the neurosis out of the concussion experience the headache had a more persistent character, a more definite localization and appeared to produce more discomfort than those found in the other conditions. The characteristic headache was one of the most significant items in the diagnosis of concussion neurosis.

It is apparent, then, that there are in the war neuroses, more or less sharply defined clinical groups, sufficiently characteristic to warrant giving to them separate neurological designations. The first six of them have a more or less characteristic mechanism; the gas and concussion neuroses are separated out because of a definite etiologic sequence, the others are questionable neuroses but should be included in a classification in use at a neurological hospital in the war zone.

#### INDIVIDUAL REACTIONS TO SHELL EXPLOSIONS

One of the most puzzling features of the war neuroses from the point of view of the variety of their clinical appearances, has to do with the question as to the reasons of individual reactions to a set of common circumstances. Why is it that one individual reacts in one way, another quite differently to presumably the identical trauma? What explanation is there for the fact that of twenty individuals blown up by a shell explosion, some will show a hysteria, another a concussion syndrome, another perhaps a neurasthenia, and the rest show no evidence of a neurosis at all? Whatever the notion of any trauma may be, it cannot, in the nature of things, affect every one within its zone of contact in exactly the same manner. Some, even of a small group, will not be in the line of its most intense pressure or force, others will be directly in that line, that is, the force of the trauma will be unequally directed. If disturbances of atmospheric pressure, first a rarefaction, then an inrush of replaced air, is the proper explanation of the effect of a shell explosion on the human



body not otherwise injured, it must be obvious that all persons within the zone of a bursting shell cannot be affected in the same way, there are, then, physical reasons which tend to unequally distribute the explosive effect of a shell. Then there is the varying position and attitude of the individual to the zone of explosive force. Some will present less of their body surface than others. One will be in a crouching attitude, another will be protected by the body of his neighbor, a third will perhaps have time enough to assume a protective attitude of physical defense. Thus there is a greater variety in the physical receptivity on the part of individuals exposed to the force of an explosion than there is inequality in the lanes of force acting on a given group. Therefore, there is no reason to suppose that all individuals are equally exposed to the force of a shell explosion.

There is another equally important factor and that is the *personal equation* in respect to the chances of a neurosis developing in each individual exposed. This personal equation has to do with a great variety of factors too numerous to enumerate completely. The physical condition in respect to fatigue, the mental and emotional stress previous to the incident in question, the physical make-up in point of resistance, the resiliency of body structure and things of that sort. Then, factors relating to the type of normal reaction of the nervous system, the quickness of the usual physical response to emotion—that of fear especially—the tendency to dissociation processes, the habitual set of reactions which are conditioned to external influences and many others of a like kind. These are the factors which have relation to the immediate and almost automatic physical defense seen in postures, attitudes, guarding movements, muscular spasms, etc.

It is necessary now to assume that the individual who is to acquire a neurosis undergoes the temporary stage alluded to several times in the course of this paper, that is, a condition in which conscious inhibition is lost and in which a state of automatism develops. During this phase the defensive physical positions, attitude, guarding or warning movement, whatever its special character becomes fixed and forms one of the presenting symptoms of the neurosis which afterward develops. An hysterically reacting individual will then show a paralysis, choreiform movements, or sets of muscular spasm, aphonia, blindness, deafness, or what not; that is, he will react cortically, superficially or crudely. Another type will react with the *mechanism* personal to him, with the purely physical expression in the background or not at all in evidence as the case may be. It is the mechanism of fixation which establishes the series of symptoms, and it is the personal and individual type of reaction that establishes the kind of neurosis that is later seen.

This explanation has been based on numerous cases studied and analyzed from this point of view, and it is merely an outline of what is conceived to be a reasonable explanation in answer to the question as to the different clinical pictures presented by a group of soldiers exposed to the same kind of traumatic incident.

The third of the phases of general mechanism can now be briefly touched on — that is, the *convalescent conflict*. This is very important in the history of a patient with war neurosis and touches very closely on his future fate, whether he returns to duty or takes his place in the partly cured, or is relegated to the rear areas or home as in the D. Class. Briefly, this conflict begins when the symptoms are disappearing and when the patient is brought face to face with the possibility of again meeting the conditions which were primarily the cause of his neurosis. The conflict is almost altogether a conscious one and such a conflict as without doubt any person in pre-war or civilian conditions might be expected to face. The pre-war patient might ask himself the question: Am I fitted to take up the duties of my previous life? The war neurosis patient does the same, but with him it is more often facing death than life. He has also to face the question of his adequacy for front-line work. If he is an officer the question of responsibility, capacity for leadership and other things come into his mind. Sometimes, if the patient is not carefully watched and as carefully treated, the neurosis from which he was emerging reestablishes itself as the best answer to his questioning, and he surrenders himself to its protecting influence, becoming in this way a permanent and an incurable case, for the period of the war at any rate.

#### MENTAL EPISODES

It is necessary to make some mention of the mental episodes through which some war neuroses pass. Instances of manic depressive, paranoiac and dementia praecox-like phases were met with frequently enough to warrant giving to this subject considerable study. They are spoken of here rather to call attention to them as important clinical possibilities than to describe or analyze them. The most significant thing about them was perhaps the opportunity they afforded to watch the mechanism of these types show themselves in their simplest forms and to view them as a part of the defense system of the neuroses. Particular attention should be directed to the dementia praecox episode in patient's recovering from amnesias associated with the development of complete or partial loss of personal identity. This intimate relationship between the curable types of psychosis and the neuroses, as illustrated in these episodes, should make for a clearer understanding of both. For it seems an undoubted fact that in both

there is at work often identical sets of mechanisms, and that perhaps in many instances it is due to the transportation of the neurosis structure as a social compromise which resists the development of an episode from becoming a chronic and incurable form of what is called insanity.

#### TREATMENT

No adequate statement of the treatment developed in a special hospital such as Base Hospital 117, can be given without describing the history and growth of the place, its spirit and purpose, and the individuals composing its staff. Therefore, the merest outline of methods used can be mentioned here. Each staff member was encouraged to work out and develop his own particular notion as to the best way to treat these cases; in this way, while many personal therapeutic technical methods were developed and often to a remarkably high pitch of efficiency, nothing new or original can be said to have been discovered. Whatever unusual facility there might have been developed in the handling of these cases came more from the importance attached to the study of the mechanism than to the emphasis on symptoms.

The cases at Base 117 represented, on the whole, the very severe types of war neuroses, particularly so in the later months of its activity. The forward screening had then become perfected enough to keep all but such cases from reaching the rear areas. The therapy found effective in the acute cases, and it was from these that the technic was developed, was found effective in the chronic types, but it took longer for the symptoms to disappear and the result in the end did not permit of as high a classification in point of military serviceability as in the cases seen earlier in the hospital's activity.

The first principle of the hospital was to cure the soldier and send him forward. If this were not possible he was to be fitted for military service in the S. O. S., with the hope that he would soon reach the front line status. The very fewest cases were to be sent to the United States; therefore D classification were permitted only in the absolutely hopeless cases, and these chiefly on account of some undercurrent organic malady or previously undiscovered organic lesion of the nervous system. After the armistice was signed, however, the hospital received a great many cases from other places. These were chronic, defective types, etc., representing the unsuccessfully treated residue of hospitals, camps, division back areas, etc. As an offset to this the percentage of higher classification after the armistice increased likewise, so that the balance was maintained and perhaps ran to more cured cases than at any other time in the hospital's history. With the disappearance of war, or rather active fighting, the necessity for the

neuroses disappeared too, or did so largely at any rate. Very few cases of war neuroses developed after November 11 *de novo*, so that the therapeutic problem after that time became much simpler and required much less effort and time. The obstacle to a cure was then the desire to be returned home, a much less forcibly working motive than that of the defense mechanism of self-preservation; it is therefore impossible to test the therapeutic efficiency of the work of this hospital by regarding the percentage of cures, because it has been shown that conditions varied from time to time. First, the acute cases were proportionately high in the early months of the hospital. Second, they ran low during the middle period, and third, after November 11 the war having ceased the hold that a neurosis had on a soldier was much less.

The second general therapeutic principle was that a patient's stay at the hospital was to be as short as possible—the average in the whole hospital was slightly above three weeks. This included the officer material which required long treatment, and also included delays in getting patients out due to transportation difficulties and all other sources of block incident to a hospital operating at the time of active fighting.

The third general therapeutic principle was that all attempts made to cure a patient should be instituted as promptly as possible within forty-eight hours if it could be arranged. Associated with this was the idea, also, that when the attempt was made it should be followed through to a finish at one sitting. This, of course, refers only to the hysterical symptoms.

The fourth principle was that the war neuroses were caused by a mechanism not under the patient's control in its initial phases, but subsequent to that in two to four weeks there might be a contributing factor in the retention of symptoms through the desire or wish of the patient to remain protected by his neurosis. At least this possibility was kept in mind, so that if a cure was not effected within that time the question of the patient's cooperation was brought up.

The fifth principle was that work of some kind was one of the most important aids in effecting symptomatic cures, so that always more than 80 per cent. of the patient's were engaged in work of some sort. This work was of a varied sort, work in the fields in season, road making, wood chopping, and work in a special shop—a therapeutic work-shop carried on by civilian aids. The only novel feature in this was that it was carried on in a hospital to meet war conditions within a comparatively short distance from the front areas.

With the more general and usual methods of treatment of cases of this kind nothing will be said, such as rest for exhausted cases,



ward isolation for excited or markedly tremulous cases, etc. Such things are a necessary part of every hospital, and it will be taken for granted that such methods were carried out as effectively as they could be in a hospital equipped under the handicaps existing in France at that time.

Such methods as presented an individual therapeutic view, were to be found naturally in the hysterics and in the anxiety neuroses, and a description of what was tried out and found of value will be set down, rather to indicate the general trend of therapeutic effort than completely to describe them.

The point in view in hysteria was that the symptoms were the result of a promptly acting shock-dissociation process, either materially or emotionally produced. If in the former it was not in any sense due to definite organic changes in the brain, but to some sort of pre-organic thing, possibly of a molecular or circulatory sort—anything which does not preclude the possibility of an equally prompt restoration to the normal. It was further appreciated that there was a mechanism of fixation of symptoms from which the neurosis tended to develop and become elaborated, so that if the emotionally fixed objective symptom could be removed thoroughly, the rest of the neurosis structure would rapidly disintegrate.

Inasmuch as hysteria was thought of as a mechanism of unconscious origin, coming into activity without the patient's awareness and often without his subsequent knowledge, its symptoms were regarded by the patient as being mysterious and strange. He himself, then, neither understood what they were, why he had them nor what they were due to. The first logical step, therefore, was to attempt to explain to the patient something about the mechanism which had been at work in making of him a hysterical type of war neurosis. The second was to assure him both of its unconsciousness and of the possibility of rapid disappearance provided he gave his cooperation, chiefly by developing a condition of receptivity as far as he was able to do so. The next step was the acquirement of an attitude of expectancy. Then followed the use of the many methods of suggestive symptomatic treatment designed to remove as quickly and thoroughly as possible, symptoms in the order of their importance to the patient. This, in turn, was followed by after-treatment aimed to emphasize the fact that the symptoms had disappeared, and furthermore, to fix the notion of the mechanism originating the symptoms and then to fix the mechanism of their disappearance. The last step was an attempt to so increase automatic inhibition that the symptoms could not reappear. This last was still in process of development when the war ended.



In the phase of explanation only very simple methods were used, depending much on the intelligence and understanding of the patient. With an understanding and belief in a definite mechanistic production of hysteria, it was not difficult to impart such belief to the patient. Without such a belief and knowledge it would have presented great difficulties. The attitude of receptivity and expectancy grew up in the patient's mind either automatically as his belief and faith in his physician took hold of him or arose from his eagerness to get rid of an embarrassing or handicapping group of symptoms. It was possible in many instances to increase the attitude by maneuvers designed to stimulate his desire for treatment. The use of apparent indifference, delay, etc., often caused an increased state of eagerness in the patient to get well. There were developed many devices to increase these essential preparatory qualities to the attack on the symptoms themselves. Some of the staff developed to a high degree, what was called ward morale. This meant the influence of the cured cases and cases cured of a similar set of symptoms, on the individual about to be treated. It also had reference to a rather mysterious thing called ward atmosphere. This was a reflection of the attitude of the nurse, physician and patients to a patient who showed neither aptitude nor inclination to meet the cooperative demands which his case warranted. It is rather difficult to describe in a few words. In certain wards patients were cured quickly and remained so. It was not customary in these wards for patients to show symptoms for more than a little while after their admission. It is of interest that this aspect of ward morale did not simply happen, but was consciously and carefully worked out by the physician and nurse.

The immediate attack on the symptoms was carried out by means of one or more of the suggestive methods everywhere in vogue throughout all the neurological services in all the armies. The suggestive treatment was either intensive — in which case, as a rule, the faradic current was used; or it was gradual — being given at intervals. In some instances the battery was not used at all, persuasion and command, argument and reasoning being all that was required. In other instances again some other material type of suggestion was employed, as tuning forks or stethoscopes in deafness, tongue depressors in aphonias, etc. Whatever method was used, great care was always taken to convince the patient that they were only intensifications of what he was perfectly able to do himself. The faradic current, for instance, used to stimulate a muscle in a case of paralysis was only a means of demonstrating the functional capacity of the muscle, so that the idea of its paralysis, engendered by the process dissociating it for the time being out of consciousness, was negatived.

The technic of intensive suggestion has been so accurately described by Yeallands that no further mention is needed in this place. The technic or the personal modifications of it developed by members of the staff at Base Hospital 117 was used in every type of hysteria and in all its various manifestations. It was very generally effective in causing these symptoms to disappear. Tremors of all kinds, choreiform movements, fixed position, all types of paralysis, blindness, aphonias, deafness, etc., were daily cured often in a few minutes, seldom taking as much as an hour. There is nothing surprising in this, especially if one considers that a certain percentage of these disappeared of themselves. Of more importance and of greater interest was the surprising degree of individual technic which grew up about each of the more expert therapists of the staff. This is a matter which is not capable of description except at the hands of those who did it. No doubt this will be done.

The hysterical amnesias as a rule were treated differently, although in some instances much of the same technic as the above was followed. More often, however, these cases were treated by various associative exercises leading back to the event for which the amnesia existed and for which it exercised its protective influence. By bringing into full consciousness this event and forcing the patient to face and square himself with it, the path of reassociative memory was found, and the amnesic block gradually grew less and finally disappeared. It was either complete leaving the thread of memory without a break, or some small remnant of block still persisted. In the latter instance it might be left as a perfectly harmless amnesic islet, as it was termed, or dissipated by putting the patient under a very mild degree of hypnosis. In this condition, no great difficulty was found in re-establishing the flow of consciousness again. A small series of amnesias was treated from the start by hypnosis.

#### TREATMENT OF THE ANXIETY NEUROSES

The therapy of the anxiety neuroses was a much more difficult thing to develop and apply. The condition itself presents a much more complicated form of neuroses than the cruder reactions of hysteria. The anxiety neurosis, as has been said, dips down deeply into the personality and touches on factors that are associated with the make-up of the individual. It has a strongly ethical character, presenting conflicts of various kinds. This dissociation has very little direct material expression and presents for this reason little opportunity for a direct therapeutic attack. An anxiety neurosis case takes a great deal more time both to develop and to treat and the individual who is capable of having it, has reacted to it much more deeply than a hysteria case ever

does. Besides this he is apt to be more intelligent; therefore, more suspicious and very much less suggestible than the hysteria. A certain amount of study must be given to past experiences, to his former life, his career in the Army and to the succession of events which brought him into the hospital. It is necessary to acquaint the patient at first hand with the causes that led to the condition, the nature of the condition. He must be instructed as to the nature of conflict, his in particular, and as to the function of repression. Above all, he must be taught to face the whole matter as a section of experience which has come into his life, and which will remain as a part of himself as long as he lives or until the memory of it becomes fainter with the piling up of those of more recent origin.

The therapeutic aim in the anxiety neuroses had formerly been to encourage the patient to forget his experiences and to aid by his own effort the automatic repressive tendency already existing. The new point of view was to attempt to train the patient to face, and to face daily as a matter of course, the experiences he had been through no matter how uncomfortable or terrifying they happen to have been. This, by the way, was not original in this hospital. Charles Myers of Cambridge had carried out this process by means of hypnosis very early in his experience with cases of shell shock, and later Rivers had advised it as a perfectly feasible thing to work out without the use of hypnosis at all. It was in a sense a modified psycho-analytic procedure adapted to a war-born condition, divorced from a good deal of the technical complications of the method used in peace times.

A patient was encouraged to talk about his experiences, to go over the emotional state which accompanied them, and to examine himself as critically as he could in reference to them. It is one thing to face a past event and to measure oneself in the light of that event; it is quite a different thing to try to forget an event and thus allow the criticism, so to say, to go on unconsciously and the resulting emotion to remain as the only conscious evidence of the conflict going on sublimated and beyond reach. The former state of mind was encouraged in the patient, the latter was to be avoided.

The chief conflicts found in the anxiety neuroses were analyzed out in some such manner as this. The technic differed according to the individual therapists. None found it necessary, however, to employ any more complicated technic than that of question and answer or that of a somewhat painstaking history-taking. A perfectly frank account of experiences with the proper narrative sequence of events together with the critical comments of the physician was all that was required in many instances to prepare the way for a successful therapy. The knowledge of such cases acquired by the therapists led to the proper

emphasis of the points he was trying to make, much in the same way that a trained psycho-analyst in the freudian sense indicates to his patient the line of associative events he desires to bring up into active consciousness. In the peace neuroses this is frequently a matter of great difficulty on account of the patient's unwillingness to face the embarrassing nature of the conflict from his point of view. In the war neurosis the conflict is formed out of simpler elements and, since the whole thing is more recent, the repressive function has had much less opportunity to bury them deeply in the lower levels of consciousness. Furthermore, the conflicts were so frequently conventionalized and so often found repeated in different individuals that it was an easy matter to present them to the patient with only a little assistance from him. In this way the rapport between patient and physician was not difficult to establish, because it was found that there was little to conceal and less possibility of deception. The favoring element therapeutically was, of course, the central motive underlying all efforts of treatment, that is, the duty and necessity of fulfilling his obligation as a soldier—the return to duty. Only in exceptional cases was this ever a matter of argument or even of doubt. There could be little weighing of contending motives in such a situation. The duty of a citizen may present many points of conflicting interests, that of a soldier none. That is none, if the point is reached, when he is brought face to face with the definite reality of his military position.

Although the methods of treatment and the general therapeutic attitude toward a patient with anxiety neurosis can be set down in so simple a manner as this, the implication does not follow that the procedure was an easy one or that it was always successful. Such certainly was not the case, for no conditions in the war neuroses were so difficult to handle or required so much effort. Comparatively few men ever acquired the knowledge, patience, tact, insight and firmness to treat such cases adequately. In Base Hospital 117, and no doubt in other places too, there developed among the staff a few men who became in a way anxiety neuroses specialists. The contrast to hysteria in this respect was marked. Almost any one after a little instruction could treat the ordinary hysterical case successfully, whereas only a few ever qualified as good therapists for the anxiety cases.

The therapeutic methods in use in the other types of the war neuroses need scarcely be mentioned in detail in a paper of this kind. Apart from the usual symptomatic treatment, the conventional hospital manner of handling the daily discomforts of a ward full of patients there was little to distinguish this hospital from any other. Drugs were given as seldom as possible, and then only to meet the simple complications of an average patient in a hospital. Bromids,



hypnotics and analgesics were given with the greatest reluctance, and for the most part the patient did better without them. It was necessary at all times to combat the natural desire of a patient for some more tangible evidence of treatment, but this the nurses were for the most part able to do.

Therapeutic use was made of many other agencies not usually mentioned in describing methods of treatment. All of them had to do with strengthening the patient's morale, and forcing on his attention at all times the necessity of getting out of the hospital and back to duty.

The hospital chaplain, Lieut. George Taylor, approached this through wisely and cleverly designed sermons touching on the spiritual phase of courage, loyalty, devotion and patriotism. The sermons and religious exercises were planned in part toward this end, as were the weekly talks by members of the staff and sometimes by visitors to the hospital. In other ways the military atmosphere was kept alive by every means possible. The decorations in the recreation huts were all planned to keep the military atmosphere in the minds of the soldier through stirring posters and scenes of actual war conditions. The walls were covered by sketches drawn for the most part by patients, of men going over the top, artillery going into action, aeroplane fights, etc.

Sympathy in the ordinary meaning of the term had little place in this hospital, intelligent insight and appreciation of the mechanism of the war neuroses in a measure took its place. The military necessity was accentuated and kept constantly in mind, but notwithstanding a certain grimness in the hospital's attitude to its patients, not the slightest suggestion of harshness or severity was ever permitted. The war neuroses were regarded as temporary conditions into which a soldier might fall and thus become a subject for medical treatment. The treatment was bound to fail unless the efforts made to help him met with the cooperation of the patient and a desire on his part to get well. The hospital was planned and equipped for the purpose of returning him to duty and, given his support, did in most cases succeed. If expressing his recent experiences by talking, writing, or even as was done in some cases, by the most lurid drawings was an aid to this end, such efforts were encouraged by whoever might happen to, at the time, be helping on his case, be it *padre*, civilian aid, nurse or some other specially qualified member of the hospital personnel.

The foregoing brief statement on the therapy of the war neuroses is designed merely to point out in a general way some of the principles which were followed. It accentuates what appeared to be the chief characteristic of the specific therapy of the war neuroses which lies in the fact that they are caused by war in the broadest sense of this



term, and that their treatment must always be influenced both by their etiology and the necessity of returning the soldiers so affected to duty as combatants, if possible, or at least to military duty of some kind.

#### RESULTS

One of the most important aspects of the war neuroses in the American Army was its educational value, both in respect to the added knowledge of the mechanism of the neuroses which resulted from the study of so considerable a material, but also to the education which came to many of the men who were in contact with the problem as it showed itself in the various organizations of the neuropsychiatric service.

For the first time, perhaps, on a considerable scale, the neuroses as a whole were approached as a complete and definite problem, and for the solution of that problem a special organization of personnel, hospitals and equipment were devised. In this way the neuroses became, under war conditions at least, a disease entity capable of the same kind of organized effort that has met with such great success in the problems presented by tuberculosis and certain of the infectious diseases.

It was planned to include in this paper a statistical résumé of the 3,000 odd cases which passed through Base 117, and the 1,500 cases studied in the shell shock wards at Base 12, the general hospital at Rouen. This can not be done here because the records of these cases have been delayed in transit.

In a general way it may be stated that about 65 per cent. of these patients were returned to the class of active duty; that is, either to front line work or to camps or stations preparatory to this. About 30 per cent. were sent to S. O. S. duty and the remainder were included in the class totally unfit for military duty of any kind. In this last class in the early history of Base 117 there were no instances of war neuroses, but only such cases of organic nervous disease and mentally deficient individuals who had been sent there unrecognized or wrongly diagnosed. In the forward neurological stations the percentage of returned cases was much larger, and in the *triages* larger still. This means, of course, that the prompt treatment of incipient cases at the hands of experienced men can prevent in many instances the full development of the neuroses in a fixed form.

#### CONCLUSION

In concluding a paper of this kind, which after all is an attempt to concentrate in a brief space an experience of many months and of a large material, something must be said in regard to the success and value of the efforts made to solve so perplexing and intricate a problem.

Did the neuropsychiatric organization of the A. E. F. handle the war neurosis problem in such a way that it ceased to be a factor of weakness in the building up of the military efficiency of the Army?

In answering this it is obvious that purely medical factors cannot by themselves furnish the necessary data. Its efficiency cannot be determined by the consideration of medical achievements only, and no amount of medical research arising out of the study of these cases can balance a lack of success in satisfying the military necessity of keeping as many men as possible on an active duty status. The test of the organization's efficiency is to be measured in terms of military utility, analogous to the test applied to an anti-tuberculosis campaign, for example, in terms of economic efficiency. It is as if the success or failure of an attempt to counteract the effects of tuberculosis in a given community should be measured in terms of the percentage of total or inefficient employment in that community, or measured in terms of economic loss in that community.

In some such way as this the military value of the neuropsychiatric organization has to be tested and, unless it meets this test—supported by the military authorities—it must be considered a failure. The following questions, therefore, have to be answered before judgment can be rendered: (1) Were the war neuroses handled in such a way that they did not become numerous enough to disproportionately burden hospital transportation and supplies? (2) Were those patients treated efficiently enough to permit a fair percentage of those afflicted to be returned to military service? (3) Was there a steadily decreasing number of men with war neuroses received in the back areas as the result of more effective screening at the front? (4) Were the individual soldier, medical officer and line officer more informed and better instructed on the subject of the war neuroses as the participation of the A. E. F. in actual fighting became more extensive?

It is a difficult matter to answer these questions without qualification and without reference to statistics. The latter cannot be made use of here on account of incomplete data, and the former would require too much space. There are so many factors apart from organization and medical matters that it is confusing in determining to which of these may be due the definite fact that, as the fighting on the Western front progressed and as the American participation became more and more developed, the proportion of war neuroses to the total casualties showed a progressively smaller percentage. At the same time the percentage of returned cases from the *triages* and the forward neurological stations became fixed within the definite percentage limits—from 70 to 80 per cent. Furthermore, the screening was so effective that only the severest types of the neuroses

reached the base hospitals and rear areas. At the time of the armistice the organization had reached this stage of efficiency. From then on the war neuroses problem was no longer concerned with active fighting conditions, but had to do with the attempt to return soldiers to their divisions in the Army of occupation or to the other areas of military activity of a noncombatant nature.

By the test then of organization efficiency as indicated by the answer to these questions, the plan and method of dealing with the war neuroses developed in the A. E. F. might be said to have shown all the indications of elasticity, adjustability and workability. As a result the war neuroses ceased to be a problem of military importance in the A. E. F. That is, the number of cases, the proportionate representation of such cases in the total casualties, the percentage of returnable cases, placed the war neuroses among the casualties of lesser importance.

There is a less definite answer to the question of the solution of it as an after-war problem. How great this problem is destined to be is of course at the present time in doubt. This doubt is not due to what was done abroad, but what might be done or what is to be avoided in the United States. The proper place to treat war neuroses is undoubtedly at the place where soldiers are being trained, and within the influence and atmosphere of combatant troops. When these influences are removed probably the most important therapeutic agent is also taken away. The methods found effective in France would, with some modifications perhaps, be found effective at home. If they are not followed no standard of fair comparison exists and the two problems must be considered apart and as essentially different.

The essential thing in this aspect of the problem is after all the number of cases which were sent over as uncured or with a hopeless outlook from the viewpoint of military utility. If this number is a relatively small one in proportion to the total number of cases, it represents a residual well within the limits of the normal military deficiencies. The method of handling this residue then depends on a point of view expressing an experience gained in actual contact with cases of real war neuroses or one based on a theoretical conception of the war neuroses from a pre-war basis. The outcome of such differing points of view remains a matter for future testing.

It would seem that, if the number of cases is relatively small, special hospitals or a special organization are no longer necessary, so that patients can be returned to their civil status as soon as possible and receive such treatment and advice as is necessary at the hands of already established neurological clinics or in neurological services in hospitals. In this way the problem becomes a part of the problem

of handling the neuroses in any community, and the fact that the qualifying term—"war"—is dropped from the designation of their malady is of definite therapeutic benefit.

A more definite answer to the last of these questions can be given when a statistical and analytical study of the total material of war neuroses is made, with especial reference to the ultimate fate of the 3,000 cases seen at Base 117, and particularly those returned as Class D to the United States. This work will be taken up in a future publication.

The medical gain from the experience embodied in the war neuroses has been very great. The increase in knowledge of the neuroses due to the enormous number of acute cases studied by a large number of neurologists under all kinds of varying conditions is large enough to warrant a complete shifting of our previous point of view. There is nothing national or characteristically American in this aspect of the question. For a period of over four years the leading neurologists of the world as a whole have been engaged in studying the reaction of the nervous system to acute and unusual traumas. A certain proportion of such traumas have shown effects on the nervous system of a definite anatomic character, a much greater proportion have shown no such effect, but the reactions have been modifications of physiologic responses, functional adjustments, which under the picture of symptoms are called neuroses. These, then, form the material on which so much effort, energy, enthusiasm and insight have been focussed. Out of this has come certain facts, many theories and points of view.

From this also, perhaps of equal value, has developed an interest among all medical men in the subject of what was called functional nervous diseases. This cannot help from having important consequences for the future. The war has given an impetus to the recognition of the facts that conditions of this kind have definite reasons for existing, are the results of definite mechanisms, and are curable if both these facts are understood and appreciated. In the war there was provided a well understood etiology capable of being individually analyzed, a series of reactions repeated in sufficiently large numbers to form recognizable types and a therapy planned to meet individual requirements. Thus the clinical sequence was complete.

To attempt to summarize in a categorical fashion a paper of this kind would serve no purpose, but certain selected tentative conclusions may be set down as indicating the point of view embodied in the paper. They are intended to suggest ways of thinking about the war neuroses rather than to express definite theories or facts, and in this spirit it is hoped they will be considered.



1. The organization and development of the neuropsychiatric department of the A. E. F. led to the formulation of a characteristic point of view in regard to the war neuroses. This point of view had a definite influence on the entire medical and military personnel in contact with the soldier suffering from the war neurosis.

2. The war neuroses are clinical entities with clinical expressions of a sufficiently definite kind to warrant type classification.

3. The varying clinical picture is due not so much to the kind of thing that happens or to the effect of what has happened, but to the reaction of the individual in the process of adjustment to the things that have happened to him.

4. The war neuroses are the products of definitely working sets of mechanisms, physiologically activated which show themselves by means of psychogenic adaptations.

5. The war neuroses are protective or defensive elaborations of the primary instinct of self-preservation in the face of destructive incidents of war.

6. For their production a certain degree of lessened normal inhibition is necessary. This is most easily produced through the effect of shell explosion by which a brief or longer period of unconsciousness, stupor or confusion results.

7. It is in this period that by the process of fixation the initial symptoms are manifested. These often are automatic repetitions of reflex defensive maneuvers.

8. The degree of lessened inhibition may be produced by a trauma which acts for the most part emotionally.

9. In the earlier phases of the development of a war neurosis volition has no place; later at the period of convalescent conflict, a varying degree of volition and wish may be present.

10. Exhaustion, fatigue sleeplessness, responsibility, hunger and thirst are important indirect factors in preparing the soil for the development of a war neurosis. The immediate factor is some sudden or unusual trauma associated with an intense degree of emotion.

11. War neuroses are not the result primarily of an organic change in the structure of the nervous system. They do not develop in the presence of serious lesions of the brain, and they are not necessary to the individual in the presence of severe wounds.

No paper on the war neuroses should be completed without directing attention to the possibility and necessity of striving in every way to translate into the problems presented by civilian neuroses the knowledge, insight and experience gained in the war. If this is not done the war neuroses are no more than an evanescent item in the casualty lists. The war neuroses are specific war-born conditions, and with the end-



ing of the war they disappear from clinical experience. Their place is taken by the civilian neuroses which are different things.

What remains are the mechanisms and therapeutic methods. These are the unchanging elements and understanding them is the permanent gain. All that is necessary is to replace the conflict of battle by the conflicts which result from social and economic stresses; to substitute less fundamental instincts for that of self-preservation, and to cultivate in treatment the same therapeutic eagerness, definiteness and incisiveness which were found effective there. If this is done the "return-to-duty" cases in the civilian neuroses will reach and pass beyond that which was possible among the soldiers who were treated in the various divisions of the neuropsychiatric organization of the A. E. F.

If it has been possible in this paper to suggest something of the opportunity for study which this material furnished, something of the spirit with which the problem of the war neuroses was approached, and something of the promise which should result from experiences of this kind to the future of American neurology, its purpose has been largely fulfilled.

## Abstracts from Current Literature

EPIDEMIC ENCEPHALITIS. ARTHUR J. HALL, M.D., Brit. M. J., p. 461 (Oct. 26), 1918.

The author reports his observation of sixteen undoubted cases of an epidemic of encephalitis which appeared in England in 1918. These cases include persons of each decade of life to the 70th year; only two were under 10 years of age. The sexes were about equally represented. In time, the epidemic extended from March and was practically over by the end of May. The clinical features are as follows:

*Mode of Onset:* The onset varied considerably. In most cases the date of onset could be fixed quite easily. In five the onset was sudden; in the remainder it may be described as gradual.

*Signs and Symptoms:* The three cardinal symptoms in a typical case are (1) lethargy; (2) general asthenia, and (3) cranial nerve palsies, the main features being the asthenia and the lethargy. Hall describes the attitude of the patient in bed as suggestive of an effigy on a tomb. The mask-like appearance of the face is increased, where there is a facial diaplegia. A definite facial palsy is not necessary to produce this appearance. One or even two of the three cardinal signs may be slight or absent. The actual cranial palsies are often slight and limited to an inconspicuous ophthalmoplegia.

*The Prodromal Period:* In most cases there is a distinct interval between the onset of the illness and the appearance of the characteristic symptoms. This interval varies widely, usually only a few days. Often neuralgia is complained of, vertigo and tinnitus, stiffness of the face, drowsiness, delirium and a slight rise in temperature. After the onset, the development of the symptoms is usually ingravescent. Ophthalmoplegia, producing a various degree of strabismus, inequality of the pupils and nystagmus, was commonly present, the last mentioned was sometimes of an irregular, incoordinate kind. Fever was noted in many cases, possibly it was present in all.

Lethargy, the most striking feature, was not a true sleep; often the patient was surprisingly awake to what was going on. Many patients were stuporous all day but became delirious at night. The delirium often suggested hysteria. Tremors with asthenia were among the chief symptoms; the asthenia and the appearance of the face, together with the tremor, suggested the syndrome of paralysis agitans.

*Results:* Complete recovery in seven cases. Practically complete recovery with some slight trace of illness left behind in six cases. Incomplete recovery in three cases.

Bringing his observations to conclusion, Hall raises the fundamental question, namely, is this or is it not an epidemic of poliomyelitis? If it is not poliomyelitis, it may be either an entirely new disease or one that up to recent times has not been observed in an epidemic form. He calls attention to the absence of limb paralysis commonly seen in acute poliomyelitis and is inclined to agree with the clinical differences more recently established by Kinnier Wilson. He makes the statement that lethargy and asthenia so severe and prolonged in most cases of encephalitis are not recorded as occur-

ring in typical cases of poliomyelitis, either sporadic or epidemic. He does not believe that the term "sleeping sickness" could ever be used in connection with poliomyelitis, and yet it would not be an inappropriate name for this present epidemic. The onset in poliomyelitis tends to be rapid and maximal, whereas in epidemic encephalitis it is often gradual and ingravescent in type.

Many nerve poisons, such as diphtheria, B. botulinus, lead, alcohol, etc., show a peculiar predilection to certain particular parts of the nervous system. In these cases of epidemic encephalitis there seems to be such a definitely selective action at work. Poliomyelitis is commonly held to be essentially a cord disease in its sporadic form, while in its epidemic form it is characterized by the multiformity of sites affected. This line of argument rather accentuates the clinical difference between poliomyelitis and the cases of the present epidemic. As regards the possibility of this being an old disease and its presence being more distinctly recognized in epidemics, Hall refers to the older references in the literature already mentioned by Kinnier Wilson. He is of the final opinion that the ultimate nature of the disease must be disclosed by the pathologist.

TILNEY, New York.

"AKRODYSTONIE" ALS VOLGEZUSTAND VON KRIEGSVERLETZUNGEN DER OBERN EXTREMITÄTEN. ROBERT BING, Schweiz. Arch. f. Neurol. u. Psychiat. 11: No. 1, 1918.

Bing reports two cases with peculiar contractions of the hand which do not fit into any of the familiar, classic types observed in injuries of the ulnar, median or musculo-spiral, or combination of injuries to those nerves. In both cases the hand was either straight or slightly dorso-flexed at the wrist, the metacarpo-phalangeal joints flexed, all the phalanges were flexed and the thumb strongly flexed and adducted, with marked overaction of the opponens pollicis. The fingers were closely adducted. Peculiar, unconscious, chorea-like flexion movements, which did not disappear during sleep, were observed. The contraction could be more or less actively overcome, though with great difficulty and effort, but passively it could be entirely reduced, only to be followed by a quick return to its former position. The grip was weakened in that the middle and proximal phalanges did not contract well. In Case 1 the patient could not immediately loosen his grip on command—a phenomenon similar to that observed in myotonia. The electrical reactions were: (1) galvanic hyperirritability of the muscles involved; (2) diminished direct muscular (?) faradic irritability; (3) undisturbed irritability of the nerves (ulnar and median) either faradic or galvanic, and (4) normal electrical formula—KCC>ACC. In Case 1 the extensor communis digitorum showed RD.

Case 1 gave a history of a bullet wound received in the elbow on May 27, 1915. The contraction followed immediately after the injury. In February, 1917, the patient came under Bing's care, but no reliable history of previous interference could be obtained. A new operation was undertaken at which a neuroma was found in the ramus profundus nervi radialis (supplying ext. com. digit.) and the median and ulnar were embedded in a cicatrix. The nerves were freed and protected by embedding in fatty tissue. Case 11 gave a history of a shrapnel wound in the forearm, just below the elbow. The patient had had four operations, none of which he could describe. Immediately following the last one the contraction set in. This patient suffered from severe hyperesthesia of the operative scar, as severe as in cases with traumatic neuroma. At operation the median alone was seen to lie in the field, but

thorough search showed it to be uninjured. The painful scar was excised. Following the operations the contractions gradually and to a great extent disappeared in both cases and the movements ceased.

Bing explains this condition on the principle of a disturbance in the tonus equilibrium of the muscles. He sees in this a purely symptomatic dystonic condition, and because it happened in the extremity he calls it traumatic acrodystonia. As the tonus of the extremities is maintained by the afferent path of the reflex arc, he thinks that the cases were the result of a disturbance in the centripetal stimuli, which conditioned a constant, stereotyped hypertonia of the ulnar and median. He believes that the cases belong to the group which the French (Babinski, Marie, Froment, Foix) call "Contracture et paralysies traumatiques d'ordre réflexe"; and he says that they are to be distinguished from hysterical contractions or those following actual injury of the nerve. It seems to the reviewer that Bing has not made his diagnostic differentiation very clear. The pictures he gave remind one a good deal of the "syndrome of irritation" described by Tinel. The rather sudden onsets point to a strong functional element. It is to be regretted that the author does not mention objective sensation.

As frequent accompaniments of reflex anomalies Bing mentions: (1) Local hyperthermia, which his cases showed, and Case 1 also hyperhidrosis; (2) strong vasomotor disturbances, which occurred only in Case 1, and (3) increase of the contraction during anesthesia and sleep, which is explained by the freeing of the spinal reflex from upper neuron control. His cases showed increased contraction during sleep, but not having received general anesthesia he could not confirm the other point mentioned by the French observers. The same authors also speak of "atrophie globale, laxité spéciale des ligaments, aspects des jointures rappelant le rhumatisme," but Bing did not observe them. Babinski also speaks only of quantitative electrical changes, whereas Bing found some faradic-galvanic dissociation. While in Case 1 the flexor contraction may have been aided by the paralysis of the extensor communis digitorum, in the second case there was no such cause, and yet the contraction was even greater. The French have described reflex paralyses and contractions conditioned by hypertonia, particularly in the realm of the median and ulnar, and some have even reported them in the muscles of mastication. Bing says that thus far little attention has been given to operative treatment in those cases. Seeing the good results in his own cases he recommends it for further trial.

WECHSLER, New York.

A REPORT OF GOITER AMONG DRAFT MEN FROM THE NORTH-WEST. CAPT. FRANK P. BRENDL, M. C., and FIRST LIEUT. H. M. HELM, M. C., Fort McDowell, Calif., Arch. Int. Med. 23:61 (Jan.) 1919.

Examination at this camp of the May and June contingents revealed a "remarkable number of thyroid enlargements." Many cases were unassociated with toxic symptoms. A considerable proportion had true hyperthyroidism. The results of these observations are given (chiefly) in tabulated form:

Case number; family history (that is, presence of enlarged thyroid only); geographical origin; size of thyroid; tremor of hands; eye findings as positive or negative for Stellwag's, von Graefe and Moebius signs and exophthalmos; heart findings, tachycardia, at rest, immediately after exercise, two minutes after; blood pressure; urinalysis, albumin, hyaline casts, granular casts.



The authors' conclusions, based on the study of 9,851 men from the nine states west of and inclusive of the New Mexico, Utah, Montana line are as follows:

1. Goiter is more common in young men than the experience of the general practitioner would suggest.
2. There are definite goiter districts in Oregon, Montana, and probably in Nevada.
3. Locality appears to be of much greater importance than family tendency.
4. Many goiters in draft men are unmistakably toxic.
5. Many toxic cases show tendency to nephritis.
6. All men having thyroid enlargement should be examined for cardiorenal pathology.

DEADY, New York.

ANALYSIS OF A CASE OF MANIC-DEPRESSIVE PSYCHOSIS  
SHOWING WELL-MARKED REGRESSIVE STAGES. LUCILE DOOLEY,  
*Psychoanal. Rev.*, January, 1919.

This paper is of unusual interest and value from three standpoints. It gives a graphic account of the life history and psychosis of a patient with that touch of the dramatic which is as necessary to psychiatry as to novel writing. We have a careful description of an atypical psychosis with recovery which is a rarity. Finally the psychologic analysis is convincing and reproduced with sufficient detail to be instructive.

An intelligible digest of this contribution would extend almost to the limit of this paper itself to which the reader is therefore strongly recommended to refer. As a mere catalogue of data presented it may be stated that we are told of a girl born of unstable stock, reared in a difficult family environment whose inferiority feeling led to social maladaptation. A stifled sex curiosity developed into perverted thoughts and masturbation, which in turn caused her sense of inferiority to become crystallized around sex complexes. There were many fully conscious ruminations on these topics. Jealousy of her sister led to a gastric neurosis, a compromise with reality which failed to solve the problem whereupon she gave up her academic life. A curettage precipitated delusions, during which suicidal (?) attempts were made and later an inadequate precipitating cause led to a manic attack at the age of 21. She then came under the writer's observation, who followed six monthly attacks, after which an excellent recovery seems to have resulted. Excitement began with euphoria two weeks before menstruation. For two or three days she regressed to her adolescence and was full of solutions of her problems. Then conduct disorders appeared which seemed to represent return to childhood. Next her behavior was full of infantile characteristics including much untidiness, even going to the extent of koprophilic indulgence. She became inactive, had persecutory ideas and was irritable for a few days, after which there was depression with painful insight into her previous abnormality. Psychological discussions of her difficulties were undertaken during these latter periods.

Psycho-analytically, the content recorded and history recovered is of unusual interest. Many well known and a number of less notorious symbolisms are reported. Two features are important. The author found ample confirmations of Burrow's theory of homosexual tendencies resulting from mother-



body-identification via narcissism. Secondly, Jung's "constructive unconscious" was prominent both in the productions of the psychosis and in the psychoanalysis. To what extent the latter served to establish a workable adaptation or how much this was the spontaneous sequel to ventilation of buried complexes is naturally a topic for unfruitful speculation or prejudiced discussion. It is only the accumulated and collected results of open-minded work such as this which can furnish us with an answer.

The question of diagnosis is intriguing. "As the psychosis progressed, the manic symptoms came more and more to the front—so that the final diagnosis agreed upon was that of manic-depressive psychosis, determined by the patient's distractibility, the flight of activity, the absence of stereotypy, the periodicity of the attacks, the manifestly extroverted type of personality, and—but this is now of very questionable diagnostic value—the complete recovery." Naturally the obvious manic traits favor such a diagnosis. On the other hand, one doubts "the manifestly extroverted type of personality" when reading over the history. Further, the occurrence of infantile sexual material makes one suspicious. One would like to have the record show more clearly just what the affective setting of each delusion or production was. Occasionally, too, one feels a little doubt as to whether some idea is given in its actual psychotic form or whether it has been expanded by analysis. The reviewer is quoted as having shown that the archaic type of reaction may occur in manic cases. As a matter of fact the paper quoted makes no attempt at diagnosis, the title being merely descriptive—"Manic-Like." (The case was indubitably dementia praecox and recognized as such.) The fact of recovery cannot be taken as conclusive, as the author admits. If the chronicity of dementia praecox be looked on as a faulty habit reaction, there is no theoretic reason for doubting the possibility of reeducating a very early case before the infantile tendencies have become habitual, precluding more adaptive satisfactions. At least, we may hazard the guess, that without the alert intelligence with which she was observed and the analytic guidance which dominated her treatment, the case here reported would have either slipped into a chronic psychosis or have had a much more prolonged attack than that from which she suffered.

MACCURDY, New York.

CERTAIN PLURIGLANDULAR ANOMALOUS FUNCTIONS ASSOCIATED WITH PSYCHOPATHIC SEXUAL INTERESTS. MARY O'MALLEY, J. Nerv. & Ment. Dis. 48:1 (July) 1918.

O'Malley describes the cases of eleven women from the wards of the Government Hospital for the Insane in which she found anomalous functioning of endocrine glands and associated with it psychopathic sexual interests. They were cases chiefly of schizophrenic and manic-depressive reactions. They presented a pseudohermaphroditism manifested in the secondary sex characteristics. *Physically* the cases were characterized (the article is fully illustrated) (1) by a male habitus, but with small delicate well-formed hands and tapering fingers; (2) by obesity which was present either since infancy, childhood, or adolescence; (3) by hypertrichosis with male distribution (beard and mustache, chest, etc.) and male outline of pubic hair, and (4) disturbances of menstruation. The *mental* characteristics are said to be a disturbance in the psychosexual development. Some of the cases showed overt homosexuality. Of considerable interest is a statement made that in three cases with manic-depressive reaction the patients showed homosexual tendencies in the depressed and normal period, while they showed heterosexual tendencies in

the excited phase. Unfortunately the paper does not give the facts on which these conclusions are based so that an independent judgment is not possible; in fact, one case is from this point of view quite confusing. The author makes a definite statement that the patient is heterosexual in her excitement. Now manic cases usually show a heterosexual content of the psychosis and we are not surprised at this, but we are at the same time told that in the excitement the patient gives full expression to the content of her unconscious. Of this expression a few snatches are given to the effect that the patient claimed to be a man, felt like a man, etc., utterances which of course are not exactly qualified to prove that this patient is heterosexual during her excitement, and one wonders how well founded the assumption is of homosexual tendencies in the depressive phase.

Hoch, Montecito, Calif.

CONSIDERATIONS GÉNÉRALES SUR LA CAMPTOCORMIE. (GENERAL CONSIDERATIONS ON CAMPTOCORMIA.) SALOFF ROSANOFF, *Nouv. Iconog de la Salpêtrière*, 28:28, No. 1, 1916-1917.

Camptocormia, derived from two Greek words meaning flex or bend the trunk (*καμπτο-κορμος*) is a term devised by Souques for functional curvatures of the trunk, often noted in soldiers who have seen active warfare. The trunk of these patients is flexed forward with or without associated bending to the side. Roentgenographic examination shows no lesion of or near the bone, and the free mobility of the vertebral column precludes the possibility of an existing cord lesion. In sixteen thoroughly investigated cases, no organic lesion could be discovered, showing that from the clinical standpoint these attitudes are purely functional. Etiologically, these cases can be divided into two groups: (1) Soldiers having a war wound or injury of some kind, and (2) soldiers free from any external wound. The first variety is very rare and in the author's clinical material was represented by only two cases, in which the wounds were, moreover, remote from the center of flexion. The second group is much more numerous, none of the fourteen patients having been actually injured in any way. The majority were soldiers who had been in the close proximity of bursting shells and who had been buried under the earth and debris or been propelled by the flying projectile and jolted in the dorso-lumbar region. The traumatism was followed by more or less prolonged loss of consciousness. In some instances, hematemesis and hemoptysis were noted, as well as transitory urinary disturbances, in the form of retention requiring repeated catheterization. Locally, according to the patients' statements, only lumbar ecchymoses were demonstrable, without sprains or fracture. In all these cases, lumbar pain was the predominant and constant symptom, manifesting itself from the start and subsiding very gradually in the course of several months. The pain was severe, continuous and aggravated by the slightest movement; it was situated at the level of the dorso-lumbar region affecting the lumbar muscles and was sometimes prolonged anteriorly in segmental form or descended to the lower limbs. After having been evacuated from the front toward the rear, the patients remained during several weeks in the recumbent position. From the viewpoint of the pathogenesis, it is noteworthy that the only position in which they felt some relief and which they were forced to maintain for some time, was one with the head placed between the lower extremities; the least movement or change of position caused intolerable pains. At the end of two or three weeks, the pain became less severe, and on trying to get up, the patients discovered

that they were "bent double" and were no longer able to resume the upright posture. From this time on, the attitude remained unchanged despite the most variegated treatment (glowing cautery, massage, electrotherapy and mechano-therapeutics, etc.).

As to the pathogenesis of these camptocormia affections, it seems likely that during the lengthy, painful period while the patients remain "bent double," the immobilized muscles adapt themselves to a certain more or less comfortable position, thus rendering stationary the muscular contraction as well as the attitude. The persistence of these attitudes is referable to a considerable extent to the peculiar psychology of the bearers of these camptocormias, who are all more or less neuropathic individuals. In normal persons with an active will-power, muscular immobility, even when prolonged, is not likely to create fixed attitudes, whereas in neuropaths a so-called "functional" secondary symptom easily assumes a preponderating place and is apt to persist even after the disappearance of its cause, through a certain inertia, a kind of habit, or by auto-suggestion. The prognosis of these affections depends essentially on this psychologic factor.

As symptomatic treatment, the plaster corset recommended by Souques seems to be the best measure for restoration and suggestion. It may be applied without general anesthesia in those cases where the patient can be spontaneously straightened out on a horizontal plane. The treatment is advantageously combined with strict disciplinary measures during the time the corset is being worn (from eight to ten to fifteen days). The patient must be assured of the efficiency and reliability of this treatment. It is advisable for the physician in person to remove the plaster corset, to insist on the certainty of the cure, and to surround the patient with an atmosphere of suggestion. This therapy has proved successful in all the reported cases.

GOODHART, New York.

#### SOME OBSERVATIONS ON THE RELATIONSHIP BETWEEN SYPHILIS OF THE NERVOUS SYSTEM AND THE PSYCHOSES.

LAWSON G. LOWREY, *Am. J. Insan.* 74:25, No. 1 (July) 1917.

Plant has called attention to certain hallucinatory states associated with neurosyphilis, the latter demonstrable serologically and neurologically. In these cases nothing in the clinical picture points to general paralysis. These cases are not very uncommon and the reviewer has seen a number of them. The internal relationship between these hallucinoses and neurosyphilis can scarcely be questioned. On the other hand, we now and then see a dementia praecox picture associated with neurologic or serologic (or both) findings of neurosyphilis. Then it is difficult to say whether we have an internal relationship or just an accidental combination. The first possibility, however, should not a priori be excluded and cases are needed which show at least a common beginning of the neurologic or serologic findings and the psychosis.

The paper here reviewed contains a report of various types of psychoses which are ordinarily not associated with neurosyphilis. We shall confine our review to some cases which Lowrey calls dementia praecox and which represent some material germane to the problems just raised by the reviewer.

CASE 1.—A man admitted in 1908 at the age of 37. At 26 he developed auditory hallucinations with delusions of persecution especially directed against his sister. He improved in a private hospital, but after being dis-

charged seven years later showed again the same symptoms. He remained throughout in good contact with the environment and was industrious, but continued to have hallucinations and delusions. He showed no neurologic signs on admission in 1908, but in 1916 a serologic investigation revealed all the findings of general paralysis. At that time the neurologic findings were again negative with the exception of the fact that the pupils reacted only "fairly well" to direct and consensual light, and that he had a slight tremor of fingers and facial muscles. Lowrey is of the opinion that probably the neurosyphilis did not exist at the beginning of the psychosis. Nevertheless the date of infection is not known and the reviewer feels that the case might belong to the Plaut group. The same remarks apply to Case 3 who was a man admitted in 1893, aged 32. In 1911 he developed hallucinations of smell and hearing and delusions of poisoning which improved, but later again he had ideas of persecution about unions. All this finally settled to a hallucinosis with a certain suspiciousness. About this case it is known that in 1911, that is, at the beginning of the psychosis, no neurologic findings were observed at the Psychopathic Hospital, nor were any observed in 1913. In the latter year, however, he had a positive Wassermann reaction in blood and fluid, a globulin excess, and 90 cells, and these findings were still present in 1916.

CASE 2.—This was a woman admitted in 1909, aged 22. A short time before admission she became violent. At the hospital she was at first indifferent, stupid, and presented meaningless laughter. Later she developed a negativistic catatonic state. Neurologically the pupils showed on admission inadequate reaction to light, and later she developed blindness (no ophthalmoscopic examination). Serologically there were found, in 1915, the typical findings of general paralysis. We must agree with Lowrey that on account of the early pupil changes the neurosyphilis probably existed from the first.

CASE 4.—A man admitted March, 1915, aged 27. At 22 he had "gonorrhea and chancre (?)." When 26 he had ideas of being watched, followed, hypnotized, also ideas of thought reading, and he heard voices calling him names. After admission the same symptoms persisted. Neurologically he was negative. On lumbar puncture there was evidence of a low grade syphilitic infection. Intradural injections of mercurialized serum improved the laboratory findings, but the injections had to be given up and the case was lost sight of.

Hoch, Montecito, Calif.

THE TREATMENT OF DEMENTIA PRAECOX BY PSYCHOANALYSIS. A PRELIMINARY REPORT. ISADOR H. CORIAT, J. Abnorm. Psych. 12: No. 5, Dec., 1917.

The title of this paper is, perhaps, a little misleading, for of the five cases cited only one seems to have indubitable symptoms of a definite dementia praecox psychosis. It would have been more accurate, perhaps, to say "Treatment of Seclusive Tendencies (or, Dementia Praecox Personality)."

Of the first cases, two recovered and the other three showed improvement. As practically no details, either clinical or analytic, are given, there is little instruction in the paper. The author makes good his claim, however, that cases should be treated early and the publication is justified if only as an encouragement to other workers.

MacCurdy, New York.



DIE VORDERHIRNGANGLIEN. With Four Illustrations. Prof. DR. E. LANDAU, Bern, Schweiz. Arch. f. Neurol. u. Psychiat. **111**: No. 1, 1918

Since it is a matter of dispute whether the caudate and lenticular nuclei and the amygdaloid nucleus and claustrum belong to one group or whether the last two form part of the cortex, Landau set out to solve the problem for himself. To this end he studied the literature and made sections of the brain which he studied by the Weigert-Pal method.

Monakow thinks that all four belong together, that there are bridges of gray matter between the lenticular and the amygdaloid nucleus, but mainly between the lenticular and caudate and amygdaloid and claustrum. Ziegler agrees with this. Brodmann is of the opinion that the claustrum is merely an inner layer of the insular cortex, and according to Wernicke the putamen also is a derivative of the cortex. Even the amygdaloid nucleus is said to belong to the cortex, that is, to the heterogeneous cortex formation of the archipallium, particularly the pedunculus olfactorius, tubercul. olfactor., and substantia perforans anterior. Voelsch and to some extent Elliot Smith concur in this view. With reference to the claustrum, Wernicke thinks that it forms part of the insular cortex because it contains exquisite spindle-shaped cells; but Luys interprets this differently—"L'avant-mur qui parait de même nature que celle du corps strié." De Vries denies on embryologic grounds the connection between the claustrum and insular cortex. As to comparative anatomy, M. Holl points out that in carnivora and ungulates the claustrum extends across the fissura rhinnica into the lateral area of the rhinencephalon, and since in animals the fissura is the boundary line between the island of Rheil and the rhinencephalon, one cannot say that the thinned out claustrum is basal insular cortex. Winkler and Potter agree with this.

In sections through the island of Rheil one does not find a continuous claustrum throughout; here and there it is interrupted by strong bundles of the fasciculus uncinatus. In horizontal sections, at the level of the ganglion habenulae, one gets the impression that the claustrum belongs to the insula, as here the external capsule is very thin and the narrow claustrum hugs the isle. But at the level where a section cuts through the corpora geniculata, nucleus ruber, commissura anterior and ansa peduncularis, the claustrum is broad, and, what is more important, it is interrupted in its middle part by the fasciculus uncinatus, so that at this level there is no claustrum on the inner part of the true isle. As it seems altogether unlikely that a foreign system of association fibers will suddenly plunge in between the separate layers of the insular cortex, Landau disagrees with the Wernicke-Brodmann view. However, one can prove ontogenetically that there is a connection between the claustrum on one side and the amygdaloid nucleus and the substantia perforans anterior on the other. One can see this intimate connection between the amygdala and claustrum if one makes a sagittal section through the amygdala, cornu ammonis and putamen. More instructive are frontal sections which anteriorly show the tendency of the claustrum to veer toward the substantia perforans anterior and further back the gray substance is seen to go to the amygdaloid nucleus.

Phylógenetically the amygdaloid nucleus is very old, Edinger having studied it in the goose. Ariens Kappers and de Lange conclude as follows: The controversy whether the amygdala of mammals is of striatal or cortical nature finds its solution in that originally (phylogenetically) it undoubtedly is striatal although it has secondary cortical connections, particularly with the paleo-



cortex. One cannot say that the amygdala comes from the temporal lobe since in rodents (not to speak of birds) there is an amygdala and no temporal lobe as yet. Based on his own sections Landau definitely states that the amygdala has connections by means of gray matter with the claustrum, nucleus caudatus, nucleus lentiformis, formatio ammonis and, last but not least, the substantia perforans anterior. He cannot say anything of the fibers of the claustrum, but he can about those of the amygdala: Some fine bundles go to (or from) the substantia perforans anterior, other thick bundles from the posterior part of the amygdala, lying laterally, go to the tractus opticus and belong to the stria terminalis (tenia semicircularis) and, finally, fibers of medium thickness probably belong to the tract, temporo-thalamicus, which was carefully described by Dejerine.

[Conclusion: In view of ontogenetic, embryologic and comparative anatomical studies one must look on the claustrum and amygdala as structures of noncortical origin, and in the conception of basal ganglia one must include them with the lenticular and caudate.]

WECHSLER, New York.

THE CEREBELLAR GAIT: A PEDEGRAPHIC STUDY. I. LEON MEYERS, M.D., *J. Nerv. & Ment. Dis.* **49:14** (Jan.) 1919.

The author objects to the term cerebellar ataxia on the ground that it tells us nothing either as to the particular type of movement that is affected or as to the disturbance in the relationship of one movement to another, which is normally required in carrying out locomotion. His experiments were devoted to the dissociation of the general function of locomotion into its component parts so as to study them individually.

The graphic method of Marey—the registration of the movements of the limbs, communicated by air transmission from tambours attached to the limbs to recording tambours the writing levers of which record on a moving drum—was modified for use on dogs. The rubber air chamber attached to each foot was compressed when the foot rested on the floor, and expanded when the foot was in the air. The recording tambour registered these compressions and expansions and thus gave graphic evidence of the time relations of each component of the step. In a normal dog there is a rise in the curve as the foot strikes the ground, and, particularly in the case of the hind limbs, a further sudden rise may occur, beginning at about the middle of the period during which the foot is on the ground. This second rise is due to an intensified contraction of the extensors, through which the pressure of the foot on the ground is increased beyond that due to the body weight. Frequently the rise occurring when the body strikes the ground and the rise due to the action of the extensors are so nearly coincident as to be indistinguishable. With the end of the contraction of the extensors, the foot is raised from the ground, and a low portion of the curve follows. The foot is on the ground about two and one-half times as long as it is in the air in each step. When tambours are attached to all four limbs, the records show that the extension of one fore limb follows closely the movement of the opposite hind limb. At times, however, the movement of the fore limb does not begin until just before the opposite hind foot is about to leave the ground. The fore limb does not extend until the hind foot of the same side is about to leave the ground. The fore and hind feet of the same side of the body are practically never on the ground at the same time.

The Cerebellar Gait: Extirpation of the left crus primum (lobule corresponding to the lobulus semilunaris inferior in man) affected the left fore limb primarily and the right hind limb secondarily. The ataxia of the left forelimb was marked, and the animal often fell to the left. The graphic records showed that the extension movement in the left fore limb often began prematurely, occurring almost simultaneously with that of the opposite hind limb. The secondary effect, probably indirect, on the right hind limb seems to be manifested in a tardiness of the action of the muscles of this limb. The period during which the left fore foot is in the air is longer than the period during which the right hind foot is on the ground at each step. The period during which the right hind foot is on the ground is longer than the period during which the left hind foot is on the ground at each step. The time during which the left fore foot is on the ground is shorter than the time the right fore foot is on the ground. The time during which the right hind foot is on the ground is less than the time the left hind foot is on the ground.

In a second dog, the right crus secundum and a portion of the paramedian lobule (corresponding to the lobulus biventer and the tonsil in man) were extirpated. The right hind limb was primarily affected. The changes in the general time relations of the step were similar to those noted in the first dog, with the exception that left fore and right hind limbs are to be interchanged in the description.

In both dogs, the effects soon passed off, so that in two or three weeks, few changes in its gait were apparent on inspection. After this time, the changes in the records were rather indefinite.

The author finds no evidence of asthenia in the affected limbs, although, so far as I understand the apparatus, I fail to see where such evidence could be obtained from his experiments or observations. Holmes (*Brain*, Lond. 40:461, 1918) has recently confirmed Luciani's views as to the presence of asthenia in his study of a series of gunshot injuries of the cerebellum in man. Holmes also failed to find any evidence in favor of localization in the cerebellum, although he specifically states that his series of cases would not necessarily disprove the view of localization. It is to be noted that, while Meyers was dealing with cortical injuries, in Holmes' series, the destruction extended much below the surface. Whether the depth of the lesion has to do with the absence of localization and the undoubted occurrence of asthenia in Holmes' series it is not now possible to say. Meyers also failed to find any evidence of arrhythmia in the sense in which Luciani employed this term, to denote an unsteadiness or tremor in each single contraction of the affected muscles.

PIKE, New York.

#### SEALE HAYNE NEUROLOGICAL STUDIES

THE HYSTERICAL ELEMENT IN ORGANIC DISEASE AND INJURY OF THE CENTRAL NERVOUS SYSTEM. A. F. HURST, M.D., and J. L. M. SYMNS, M.D., Seale Hayne Neurological Studies 1: No. 3, November, 1918.

1. From a large clinical experience during the past four years with soldiers, the authors emphasize the frequency of associated hysterical and organic nervous disease. The observations which they have made in the Seale Hayne Military Hospital in England and which are alluded to in numerous case reports, would appear to show that this association is much more frequent

than was formerly supposed. Every case in which an associated functional nervous element is conceivable should be tested by psychotherapy.

The associated conditions fall under two main groups. The first is one in which organic lesions and signs precede paralysis but may still persist and progress following striking improvement in the associated functional disorder. This is exemplified in early disseminated sclerosis and tabes. A case of tabes is related in point. The patient was unable to walk for six years, but was again able to do so after a treatment by reeducational psychotherapy lasting a few hours only, and at the end of a week was able to walk normally. It is questioned whether benefit following Fraenkel's reeducational exercises is not due, at least in part, to suggestion. In disseminated sclerosis the ordinary remissions may be due to removal of the superimposed functional nervous disorder by suggestion, as, for example, following the administration of nonspecific drug remedies.

The second group consists of cases which are primarily organic but ultimately hysterical; the residual organic lesion being sufficient to produce physical signs with or without loss of organic function with tendency toward betterment. In this group a case is reported of combined hysterical and organic hemiplegia of two years' duration with almost complete recovery following psychotherapy; also cases of hemiplegia, paraplegia and blindness from wounds and shell concussions with remarkable improvement following appropriate treatment of the functional component.

The relative rôle which the organic and functional symptoms play in these different groups is illustrated graphically in a table of time and percentage incapacity. The writers classify some of the symptoms and signs which are supposed to distinguish organic and hysterical paralysis. Although it is generally considered that incontinence of urine is never hysterical, a case is mentioned in which such a condition following spinal concussion and lasting eleven months was cured by psychotherapy.

The waiting attitude in the treatment of acute organic nervous disease is condemned because functional capacity does not always tend to return *pari passu* with structural recovery unless the physician makes use of psychotherapy in combination with reeducation from the earliest possible moment. Treatment of this kind is also preventive against associated functional nervous disorders.

## 2. HYSTERICAL VOMITING IN SOLDIERS. W. R. REYNELL, M.D.

Hysterical vomiting in soldiers is comparatively common according to Reynell. He has observed eighteen cases in five months. The cases are amenable to treatment and cure by psychotherapy in a comparatively short time. The condition results from the perpetuation by suggestion of a symptom due to a pathologic condition. It therefore may follow gassing, dysentery, trench fever, surgical anesthesia, phthisis or appendicitis. In a number of cases emotion was the common cause. Characteristic symptoms are: independence of food, although most patients vomit after each meal; epigastric pain relieved after vomiting; the watery character of the vomit, and occurrence after slight emotional upsets or even slight physical exercise. Treatment by psychotherapy may be reinforced by the suggestive effect of the stomach tube. As the basis of this study the author suggests that the pernicious vomiting of pregnancy, and after surgical operations is often purely hysterical. The contentions of the writer are illustrated by case reports.

## 3. HYSTERICAL DISORDERS OF MICTURITION. J. W. MOORE, M.D.

Moore believes that experience with the war neuroses necessitates a revision of our views regarding hysterical disorders of micturition. A reference to the literature is made in which there is practically a unanimity of opinion that true incontinence of urine does not exist in a neuropath. The writer reports four cases of incontinence, one of them complete; and one case each of retention and "stammering bladder." The cases were readily cured by psychotherapy, hypnotism being employed in several cases.

## 4. HYSTERICAL OCULAR SYMPTOMS COMPLICATING CONJUNCTIVITIS. A. F. HURST, M.D., and C. H. RIPMAN, M.D.

This study with case reports is with special reference to gassing followed by ptosis, blepharospasm, spasm of convergence and accommodation and amblyopia. Inability to open the eyes which persists for more than three weeks after gassing can be presumed to be hysterical, unless well marked lacrimation is present. As inflammation subsides there occurs in abnormally suggestible individuals, anxious about their eyes, a voluntary inactivity of the levator palpebrae superioris which becomes perpetuated as involuntary activity or hysterical ptosis. Reflex blepharospasm is perpetrated as hysterical blepharospasm. The condition of hysterical blepharospasm and hysterical ptosis are usually present together but not always. An uneducated man if unable to open his eyes imagines he is blind. Hysterical blepharospasm and ptosis is often accompanied by hysterical amblyopia. Indistinct vision is due to a combination of hysterical paresis and spasm of accommodation and convergence.

## 5. HYSTERICAL APHONIA IN SOLDIERS WITH SPECIAL REFERENCE TO GASSING. A. WILSON GILL, M.D.

Aphonia is one of the commonest hysterical symptoms seen in soldiers and occurs most often following exposure to irritant gasses, but also follows other inflammatory conditions such as catarrhal laryngitis; or may be due to exhaustion, shock, emotion, wounds of the neck or laryngeal concussion. As a result of the stress and strain of war the soldier is liable to develop, at first by autosuggestion, the idea that some real and permanent damage has been done to his voice. This aphonia may be due to a flaccid or spastic condition of the laryngeal muscles compared to the flaccid and spastic varieties of hysterical paralysis of a limb. In the first variety the vocal cords remain in the cadaveric position, no trace of adduction occurring when an attempt is made to speak. The patient obviously makes no attempt to speak as can be easily determined by an external examination of the larynx. In the spastic variety on attempting to phonate both the true and false cords are tightly pressed together and the spasmodic action of the larynx is accompanied by irregular spasmodic action of the expiratory muscles, the chest becoming fixed, the face congested and the veins of the neck swollen.

The laryngological examination does not always reveal the true nature of the aphonia as the appearance of the larynx may suggest organic cause. A case is quoted in point cured by psychotherapy in twenty minutes, in which the laryngologist's report was "mucous membrane much atrophied; vocal cords practically nonexistent; this condition is permanent." In similar cases of mistaken diagnosis intralaryngeal methods of treatment may be directly harmful tending to further fix the neurosis.



Treatment is by simple persuasion and suggestion, neither electricity, the intralaryngeal catheter or ether anesthesia being employed, as was at first often the case. Assured of a cure by the medical officer the patient is first made to come in contact with other cured patients. The following treatment is preferably given alone. It is explained that the use of the voice has been forgotten; this has come about by the enforced silence following the inflammation of the vocal cords which has now disappeared. The patient is then asked to cough. The cough is compared to the sound of "one." He is then told to cough and say "one" immediately afterward. He often succeeds in the first attempt and is soon able to count and talk in his natural voice. It has not been necessary to limit smoking or to give any drugs. The treatment is the same in both the flaccid and spastic types of aphonia.

6. A STUDY OF EPILEPTIFORM CONVULSIONS IN SOLDIERS.  
R. G. GORDON, M.D.

Gordon calls attention to the large number of cases (4,257) diagnosed as epilepsy in those who had been discharged from the British service up to Aug. 31, 1918. He questions whether all of these cases should be classified as true epilepsy. The psychogenetic factors which cause a hysterical fit are discussed in a consideration of functional epilepsy. The cases referred to as having had true epilepsy are included in two groups. Firstly, are those patients who have true epilepsy in childhood or early adult life, but in whom the disease had apparently ceased until the occurrence of an emotional crisis; secondly, true epilepsy complicated by hysterical fits.

From the diagnostic standpoint there are only three signs which speak positively in favor of organic epilepsy. These are: (1) the extensor plantar reflex occurring after the termination of the fit. It is, however, fleeting—disappearing almost immediately after return of consciousness; (2) cyanosis hysterical patients being flushed as a rule, and (3) conjugate deviation of the eyes.

Treatment of the hysterical condition or associated condition may be undertaken by hypnosis or preferably by "autognosis," a term suggested by William Brown. By this term is meant that the patient is afforded insight into his condition and is made to understand thoroughly the pathogenesis of his fits. In carrying out this latter method the patient's confidence must be gained and he must be encouraged to fully detail the history of his case and symptomatology. Help may be obtained from an analysis of his dreams. The next step is to determine under what emotional conditions subsequent fits developed. He should then be taught how his emotional energy must be directed into proper channels, and how his mental make-up and attitude toward life must be stabilized. Conscious and unconscious worries must be given their proper values and mental powers of concentration and memory developed. Physical exercise should not be neglected.

7. A SERIES OF HYSTERICAL CASES IN SOLDIERS. G. MCGREGOR, M.D.

In this paper the case histories of eight cases of hysteria in soldiers are detailed to illustrate the widespread occurrence of functional disabilities in the Army and the ease with which they may be cured. Among the cases reported are: monoplegia, paraplegia, hysterical gait, aphonia, mutism and hysterical stiff joint.

SCHALLER, San Francisco.



## Society Transactions

### PHILADELPHIA NEUROLOGICAL SOCIETY

*Regular Meeting, Jan. 22, 1919*

MAX BOCHROCH, M.D., *President*

#### HYPNAGOGIC HALLUCINATIONS IN A RESTORED EPILEPTIC.

Presented by DR. N. S. YAWGER.

The patient Dr. Yawger had hoped to present is a girl of 15 years whose epilepsy declared itself at 3½ years. At 13, when the child came under observation, she was having one or two attacks a week and occasionally as many as six during a night; her seizures occurred mostly when asleep.

The girl is said always to have been slightly mentally subnormal. At 13 years she was placed in the Oakbourne Epileptic Colony where her medicinal treatment for the first few weeks was 3 grains of chloretone daily; the drug was subsequently increased to 6 grains, which amount was continued for many months. Since September, 1917, there have been absolutely no epileptic seizures.

It is of unusual interest that for years this girl has been experiencing hypnagogic hallucinations. By these one understands the optical manifestations of a few persons, observed during the transitional stage from wakening to slumber, in which objects or scenes of various kinds pass rapidly before the sight. Some individuals observe these hallucinations with their eyes open, but more commonly they are closed.

These manifestations are seen by this patient after closing her eyes, just preceding sleep, and sometimes they are so distressing as to interfere with sleep. Dr. Yawger observed that by blindfolding the child the hallucinations could be induced at any time. She does not lend herself willingly to the procedure and usually struggles to get free; even talking afterward about the matter as distasteful to her.

Once, Dr. Yawger recalls, while experimenting with her she said, "There is a little dog," and groped blindly toward the object of her fancy; her eyes were uncovered and five minutes later when the subject was mentioned, she walked into the adjoining room where she thought the dog had disappeared and in surprise said, "Well, he is gone, but he was a nice dog anyway." At times the experiment is followed by decided drowsiness and the child will rub her eyes as though just wakening.

This is the fourth instance in which Dr. Yawger has encountered hypnagogic hallucinations—twice in normal persons (*Journal Abnormal Psychology*, June, 1918) and twice in epileptics.

#### DISCUSSION

DR. S. L. IMMERMAN said that he had had a patient in the hospital who so far as he could tell was a case of general paralysis of the insane. He had dementia and all the signs that usually go with paresis. He claimed that by closing his eyes he could see women in front of him. He described their

size and how they looked and so on. He seemed to realize that there were no women there, that they were imaginary. He also had auditory hallucinations, real auditory hallucinations, which he did not recognize as such, while he would talk about these women which he did recognize as having no reality. Dr. Immerman said he thought it had been stated of Goethe, that he could produce some kind of visual hallucinations at will. He could see some kind of fancy figures with eyes open or closed. He did not know whether this could be called an hypnagogic hallucination, but it seemed very much like it.

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A CASE OF NERVE SYPHILIS WITH ACUTE INVOLVEMENT OF THE AUDITORY NERVES AND COMPLETE DEAFNESS. Presented by DR. JAMES HENDRIE LLOYD.

Involvement of the eighth nerve in syphilis has come to be recognized as not only an important but also a much more common feature of syphilis than we have heretofore been in the habit of regarding it.

The patient was a negro, a ship-cook, about 30 years of age, a large robust man who had always been in good health. In June, 1917, he was treated in the venereal wards of the Philadelphia Hospital for a chancre and secondary eruption. At this time he had one treatment with arsphenamin. Later he had a syphilitic iritis, for which he was treated in the eye wards. There is no record at this time of any nervous symptoms. He left the hospital and apparently returned to his work, but about two months later, while on ship-board, he was taken with a severe frontal headache, worse at night, and so severe as to force him to give up work and return to the hospital, where he was admitted to the nervous wards.

On first examination the man's only complaint was of the headache, which was urgent and led him to beg for relief. The right pupil was dilated and rigid, the result of the iritis, and there was some visible congestion of the eye. The left pupil reacted sluggishly to light. Other examination as to cranial nerves, gait and sensation was entirely negative, except that the knee-jerks and Achilles jerks were much diminished. There was no Romberg symptom or ataxia. As a routine measure the hearing was tested, and no deafness was observed.

Both the blood and cerebrospinal fluid were positive, and a very high lymphocytosis was reported—1,600 cells to the cubic millimeter. Later after treatment the blood became negative, but the cerebrospinal fluid remained positive, although the cell count was much reduced. He was given a mixed treatment with mercurial inunctions and several doses of arsenobenzol.

In October the report from the ear clinic was that hearing was normal, but late in November the report was that hearing was somewhat impaired, but the drum membranes were normal.

The man remained under observation during most of the winter. The headache had entirely disappeared, as had also the iritis—which, however, had left a rigid pupil and clouded medium. The fundus of the other eye was normal. The patient's condition was satisfactory. Later he eloped from the hospital and was gone several weeks. In March, 1918, he returned. By this time he had become very rapidly deaf—to such a degree that it was difficult to speak with him. The report from the ear-clinic at this time was as follows: In the *right ear* there was mixed deafness; the involvement of the receptive apparatus seemed to be confined to the labyrinth. In the *left ear*

mixed deafness from the standpoint of the receptive apparatus was extensive and seemed to indicate that the lesion was in the course of the nerve—or central. Active treatment since that date has not relieved the patient of his deafness.

According to Dr. G. W. Mackenzie of Philadelphia, who has recently contributed an important article on this subject, syphilis may affect the inner ear alone, the eighth nerve alone, or both combined. It may involve either the cochlear branch, or vestibular branch, or both. It is commonly bilateral, one-sided cases being very rare. It may occur as a mononeuritis, or a polyneuritis, being then involved along with the second, fifth and seventh nerves especially. It may occur very early after the primary infection—in fact, as early as the seventh day, according to Politzer. Randall saw a case in a physician, following a needle-wound of the finger, in which the deafness occurred at the end of the fourth week. Its progress may be very rapid, and if it is not treated heroically, it may lead quickly to incurable deafness. It is the cause of deafness in congenital or hereditary syphilis.

It is highly important that neurologists should recognize the possibility of this invasion and be on the lookout for it—just as much so as in the case of the optic nerves. It has been charged by some observers that this affection of the eighth nerves has been caused by the use of arsphenamin, just as this accusation has been made in the case of the optic nerves. Mackenzie criticizes this claim very carefully, and does not accept it, but believes these cases are instances of neurorecidivus, in which the treatment has not been sufficiently active.

As to the pathology, it seems that the nerve may be attacked either primarily or secondarily to the membranes. The labyrinth itself may be invaded, and in the congenital cases the bone also has been involved. There are many nice questions as to the mode and order of onset, but these can well be left to the pathologists who delight to expound the minutiae of such subjects.

#### DISCUSSION

DR. WILLIAM G. SPILLER said that the isolated paralysis of cranial nerves in syphilis is a remarkable phenomenon. He had seen paralysis of both facial nerves without implication of any other cranial nerve; he had also seen paralysis of the trifacial nerve alone. It is difficult to explain the occurrence of paralysis of both acoustic nerves or of both facial nerves without other cranial nerve disorder. Possibly the explanation may be found in the anatomic relation of these nerves. They are situated in the angle formed by the medulla oblongata, pons and cerebellum, and when the patient lies on his back the syphilitic poison might settle in these depressions so that the structures situated here would be exposed to greater intensity of the poison than would other structures.

This is an explanation that also may be offered for the greater intensity of syphilitic meningo-myelitis in the posterior part of the thoracic cord. It is common to find the syphilitic lesions more intense in the posterior than in the anterior part of the spinal cord. The patient in lying on his back exposed this part of the cord to a cerebrospinal fluid which by gravity contains a greater amount of syphilitic poison.

The acoustic nerve is often affected in tabes and it is not surprising therefore that it should be affected in cerebral syphilis, but isolated paralysis of the acoustic nerve is decidedly rare, while isolated paralysis of the oculomotor nerve is common.

DR. CHARLES S. POTTS said that he had not heard Dr. Lloyd's paper, but two years ago he had presented a case before the Society from the Philadelphia Hospital in which the only evidence of syphilis was bilateral disease of the eighth nerve and also of the optic nerves. This man was apparently cured, at least he left the hospital practically well after a rather intensive treatment with arsphenamin and mercury.

#### REMARKS ON BRAIN TUMORS IN PSYCHOPATHIC SUBJECTS.

DR. S. L. IMMERMAN.

These remarks are based on the findings of three cases of brain tumor, discovered at necropsy, out of seventy-five necropsies, in the last three and one-half years, on patients from my wards at the Philadelphia Hospital for the Insane.

CASE 1.—This patient was admitted in 1903, at the age of 43, on account of dementia. He died of acute hemiplegia in 1917, without previous localizing symptoms. His eye-grounds could not be examined on account of old phthisis bulbi. Necropsy revealed a right-sided parietal glioma, which had recently impinged on the cortex by expansion from hemorrhage.

CASE 2.—This patient was a middle-aged man, confined to the institution for three years on account of dementia. He showed optic neuritis with hemorrhage, diffuse signs referable to his central nervous system, and a positive Wassermann reaction in his blood and spinal fluid. Necropsy revealed a cerebello-pontine tumor—a sarcoma.

CASE 3.—This patient, a man, aged 65, died several months after admission to the hospital. There was no history. He showed apathy and somnolence; no localizing signs; eye-grounds were not examined. Necropsy revealed a left frontal lobe tumor—an endothelioma—which had also involved part of the corpus callosum, and right frontal lobe.

The practical conclusions to be drawn from these cases, though not new, are worth emphasis:

1. Patients suffering from brain tumors may be sent to psychopathic hospitals, usually under a mistaken diagnosis of paresis, epilepsy or chronic dementia.
2. Certain kinds of mental symptoms are suggestive of brain tumor.
3. Even in the absence of definite localizing signs, certain mental symptoms should lead to examination for brain tumor.

#### DISCUSSION

DR. SAMUEL T. ORTON said that Dr. Immerman has brought over the tumor and it had proved to be a rather interesting one. The tumor had been in formalin and so did not lend itself to finer histologic methods. Special stains showed more or less what the characteristics were. The tumor he thought belonged to the endothelioma family, but a very low grade. Dr. Orton said he was able to rule out the spindle cell type by special tissue stains and that left us practically with the diagnosis of sarcoma or endothelioma. The tumor cells were themselves very relatively small, the nuclei small and less vesicular than one expected to find in a characteristic endothelioma. The structure of the tumor did not show whorl formation, did not show any tendency to flatten out over the surface of connective tissue strands or over the vascular structures, and did show a certain amount of fibrillation of the cytoplasm. He thought the fibrillation was enough to rule out the cellular glioma and



probably a sarcoma. The tumor was a very slow growing one and exhibited considerable hemorrhage. On the whole, although the tumor was of considerable size, it had probably been growing for a considerable period. Dr. Whitney reported a patient in the Worcester Hospital in whom the tumor reached the size of a small lemon, and whose history they were able to trace back for approximately twelve years. Only for the last six months was the man sufficiently incapacitated to bring to the hospital. That also was an endotheliomata, slow growing and malignant only in the sense of producing pressure symptoms. That tumor had produced a paralysis late by secondary softening and probably not by any direct pressure on the motor areas themselves.

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#### LUMINAL IN EPILEPSY AND IN DISTURBED AND EXCITED STATES. (Special Communication.)

DR. FRANCIS X. DERCUM spoke briefly on the subject of luminal and luminal sodium. His attention had first been directed to the great value of luminal in disturbed and excited states by an article in the *Journal of Mental Science*, July, 1914, by Dr. Richard Eager. It occurred to Dr. Dercum to make a trial of the drug in epilepsy, and he has done so with the most gratifying results. At first he had given the drug three times daily as in the common administration of the bromids. He found, however, that used in this manner it sometimes made his patients a little heavy during the day and, at times, even a little dizzy. He found that if he limited the administration of the drug to one dose at bedtime, that these symptoms did not appear while the efficiency of the drug was in no wise impaired, if indeed it was not enhanced. He found that in epilepsies, even when most confirmed, the drug exercised a remarkable control over the seizures. The latter were usually promptly inhibited altogether. The doses required were exceedingly small. A grain and one-half of luminal or 2 grains of luminal sodium given at bedtime were ordinarily sufficient. Very rarely had he been obliged to give so large a dose as 3 grains. In a number of instances the use of luminal as here indicated had resulted in the abolition of the convulsive seizures for periods extending not only over many months, but even over several years. It was in the group of the "essential" or "morphologic" epilepsies that the efficacy of the drug has proved most remarkable. Indeed, in some of the cases, the luminal acted virtually as a specific. It is noteworthy, too, that at no time was the slightest deleterious or untoward effect noted. Respiration, circulation, temperature are uninfluenced—even by the most prolonged administration—nor is there any induction of a drug habit or craving, for the action of the remedy is unattended by either pleasurable or disagreeable sensations.

In regard to the efficacy of luminal in disturbed and excited states, Dr. Dercum was able to confirm the observations of Dr. Eager. Here it also proved to be of the very greatest value. He instanced, among others, its action in a case of chorea insaniens. The latter presented a typical history. Some four weeks before her admission to the Jefferson Hospital, the patient had been delivered of a child and during the puerperium had developed the chorea. At the time of her admission the movements were violent and incessant. The patient had been much exhausted, had been practically sleepless for a long time, and had become actively hallucinatory and confused. Three-grain doses of luminal sodium were given hypodermically at intervals of four hours. The results were almost immediate. Some twenty minutes after the first hypoder-



mic injection, the movements grew markedly less, and after a few repetitions of the dose ceased altogether. The patient began to sleep and to take food and subsequently made a very prompt and uneventful recovery. The result in this case was truly remarkable, when we consider how fatal chorea insaniens commonly is. In other cases with disturbance and excitement, Dr. Dercum has since used the drug with equally good effect.

Luminal sodium is very soluble. Its hypodermic administration is unattended by any local irritation and no unpleasant after-effects are experienced. Naturally, however, we should be cautious and tentative in its use.

Luminal belongs to the series of adalin, veronal and medinal. Unfortunately, the supply in this country is practically exhausted. It is to be hoped that our own chemists will be stimulated to manufacture this drug, which Dr. Dercum maintained has a remarkable and unique therapeutic value. Its action in epilepsy, used in the manner indicated, was incomparably superior to that of the bromids, while the facts as to its efficacy in disturbed and excited states generally reveal it to be a drug of great range of usefulness.

#### NEW YORK NEUROLOGICAL SOCIETY

*Three Hundred and Seventieth Regular Meeting, held at the  
Academy of Medicine, Feb. 4, 1919*

FREDERICK TILNEY, M.D., *President*

#### A CASE OF SUCCESSFUL REMOVAL OF A TUMOR OF THE SPINAL CORD. Presented by DRs. C. C. BELING AND ALFRED S. TAYLOR.

The patient, an American woman, aged 39, is today apparently perfectly well. She was first seen Jan. 6, 1916. Three months before she noticed that her feet were numb, especially the ends of her toes. After a short period of time—how long she does not definitely remember—she began to experience a feeling of general stiffness and lameness, which increased gradually. This was followed by an intense localized pain in her back, across her shoulders and radiating down the right arm as far as the elbow. It was more excruciating at night, especially after she went to bed. In her own words, "One day it was an ache, the next day it was a pain, and the next day it was as if I were being lashed across my shoulders." From then on the numbness in both lower extremities increased and was more marked in the right. The right leg felt much stiffer than the left during locomotion. Her bowels were constipated and she experienced some detrusor weakness in urination.

Examination showed a Brown-Séquard type of lesion of the spinal cord at the level of the fourth dorsal vertebra. She entered the Newark City Hospital on Jan. 11, 1916, and remained under observation until January 15. Blood and urine examinations were negative and Wassermann tests of the blood and spinal fluid were negative. Roentgenograms showed some obscure bony thickening about the fourth and fifth vertebrae. About January 25 the sensory disturbances extended upward and spread into her arms and hands, and the paraplegic symptoms became more pronounced.

Regarding the sensory findings made the day before operation, the relative levels of the receptors for touch, pain, heat and cold were interesting. The pain receptors occupied the lowest level, touch the next, followed by the heat and the cold receptors. Another remarkable feature of their distribution in the skin was their coalescence and interlacing at the axillary and cubital

flexures. These sensory features were evidently of biologic significance, and showed an evolutionary adaptation of the organism to environmental influences.

Operation was advised and was performed on Jan. 31, 1916, by Dr. Taylor. A right unilateral laminectomy was done, involving the laminae of C<sub>6</sub> to D<sub>2</sub>, inclusive. When the bone was removed there was a palpable tumor beneath the dura, just about in the middle of the exposure. The dura was split the full length of the exposure, and a soft, friable, vascular, lobulated tumor was found, situated chiefly on the right side of the cord dorsally, and extending a little backward and over to the left of the median line dorsally, and forward along the right lateral aspect of the cord. The tumor was about 6 cm. long by 2.5 by 1 cm. It appeared to be situated beneath the arachnoid membrane. After the arachnoid was divided over the tumor it could be peeled out with comparative ease, and seemed to have no direct adhesions to the cord substance. The posterior veins of the cord were intensely congested. The cord was somewhat flattened postero-laterally on the right side. After careful hemostasis, the edges of the dura were sutured by interrupted fine catgut sutures. The muscles and aponeurosis were closed by chromic catgut and the skin by silk. No drainage was used.

On March 6—the thirty-fifth day after operation—she had a large, formed, voluntary stool, and from that time on had control of the bowel. On March 11—forty days after operation—she was able to take a few steps, with assistance, and was taken home on that date. From this time on there had been steady improvement.

Pathologic examination and report state that the tumor was an atypical neurofibroma. At one point near the middle of the tumor a nerve was found, the branches penetrating the growth. It was very cellular in some places, while in other places fibrous elements predominated. The blood vessels showed dilatation, thickening, congestion, and a nuclear increase in the vessel walls. In some places the vessels appeared obliterated and there were many small hemorrhages distributed throughout the field.

#### DISCUSSION

DR. I. ABRAHAMSON thought it was very unusual in a unilateral tumor to get bilateral sensory symptoms so early. All the signs seemed to have pointed to its being an extramedullary tumor. Fourteen years ago he showed a case of extramedullary tumor without pain in which the first symptom was paresthesia, at first in the toes of the right foot, and soon afterward in the left toes, one of the earliest cases of neoplasm of the cord without pain that he had ever seen. The tumor was found, as diagnosed, antero-laterally situated.

DR. JOSEPH BYRNE remembered a case parallel with this one except that the growth was a little further down in the cord. In that case, the symptoms were almost like those of Dr. Beling's case, beginning with root pains around the level of the twelfth thoracic on the left; this was followed by stiffening in the left foot and then by weakness in the other foot after several years. This tumor took from ten to eleven years to develop to full maturity. In the meantime the patient gave birth to three children. Dr. Taylor removed the growth in a unilateral laminectomy as in this case. Notwithstanding the fact that the tumor was as large as a Brazilian nut the exposure through the unilateral laminectomy gave a very satisfactory view of the growth and the cord and was quite adequate in every respect. Though the tumor was successfully removed the patient succumbed the day following operation. She had been a victim for years of mitral insufficiency.

THE OPPORTUNITY OF AMERICAN NEUROLOGY. (Address of the Retiring President.) Delivered by DR. FREDERICK TILNEY.

Dr. Tilney ignored the academic, for in the light of the great changes that had occurred throughout the world in the past two years, the opportunity of American neurology was practical, broad in its scope, compelling in its demand, and entering with insistence into the life of every neurologist. Recent and present events made the future for them alluring to contemplate. Among the changes that the war had brought about was the prominence given to learning and the pursuit of knowledge, probably because it had been shown that education was one of the main supports of civilization. Renewed interest had been aroused in the psychologic and sociologic studies of man and his conventions. The destruction of war had placed Europe at a disadvantage in its intellectual pursuits. This fact should be recognized at once in America as an opportunity for service, the purity of motive being enhanced by the lack of aggrandizing competition. America, having at last taken her place beside the valiant, hard-pressed champions of right and turned the scales to victory, had come to know her usefulness. The entire country seemed everywhere to recognize this; everywhere was a new spirit, a new alertness and comprehension. What was true in all other lines of activity, commercial, intellectual, educational, was also true of the medical profession. The opportunities for work in the growing fields of human service were the chief topics of conversation in medical circles and among medical men.

The phase that interested neurologists most intimately was the development and advance of neurology in this country, and it was to the opportunity presented by combined and well organized effort that American neurologists must address themselves. Assuming that this fact was recognized in a general way, practical consideration made it necessary to consider the problem from the standpoint of locality, and the question arose, how could each contribute most and proceed most efficiently in the general forward movement in the interests of neurology. Other cities throughout the country would have their problems to solve, but those here in New York were particularly difficult and demanded not merely vision and patience, but a large and generous consideration of the whole situation. There was no place today where it could be said that the diseases of the nervous system received adequate postgraduate attention. New York City contained in its many scattered institutions a wealth of neurological material probably surpassed nowhere in the world. Here also was a distinguished group of workers in neurology and psychiatry whose distinction and services could be enhanced by coordination in their efforts. With such an obvious opportunity and need, together with the material and the workers, New York could readily be made a leading center in neurology and psychiatry. The fundamental requirement to achieve this end was coordination, and if this could be brought about it would serve to do away with many of the difficulties which stood in the way of neurological progress, and would mobilize the wealth of clinical, pathologic and morphologic material to mutual advantage as well as for advanced teaching and research in neurology and psychiatry. The success of such an undertaking would depend almost entirely on the individual enthusiasm and real devotion for the best interests of this particular subject.

In retiring from the office of president of this Society, Dr. Tilney expressed his sincere appreciation for the loyal support that had been accorded him in his attempts to serve the best interests of the Society during the past two years. It gave him great pleasure to welcome Dr. Timme to the chair.

LAMINECTOMY FOR INTRAMEDULLARY (?) TUMOR OF THE SPINAL CORD REMOVED BY TWO-STAGE OPERATION; LATER LAMINECTOMY AND POSTERIOR ROOT SECTION FOR SPASTICITY; REMARKABLE IMPROVEMENT. Presented by DR. CHARLES A. ELSBERG.

A young woman, aged 17, was admitted to the neurological service of Dr. Sachs, Mount Sinai Hospital, in January, 1912. She gave a history dating back a year, of increasing weakness in all four extremities with marked sensory disturbances and changes in her reflexes. She had been treated for a period as a case of Pott's disease and had been in a plaster cast. Her symptoms were those of a compression of the spinal cord at the seventh dorsal level and she was transferred to the surgical service for operation. On March 20, 1912, Dr. Elsberg performed a laminectomy, removing the arches of the sixth and seventh cervical and first and second dorsal vertebrae. When the dura was opened a tumor 2 inches long situated on the posterior surface of the cord was exposed. The tumor was either covered by a thin capsule or it was covered by a thin layer of spinal cord tissue; this could not be definitely determined. The tissue over the tumor was incised and the wound then closed for the time being. A specimen of the tumor was removed for examination. The patient had lost complete control in the lower extremities and had very little power in her upper extremities when she was operated on. Within a few days of the operation she improved very markedly and had recovered considerable power in both upper and lower extremities.

One week later the wound was reopened and the tumor was found to be lying outside of the cord. The pathologic report was that the tumor was a fibro-lipoma. When attempt was made to remove the growth it was found to be still partly embedded in the cord, but with care it was carefully peeled out of its bed. As the result showed, this procedure was wrong. The operation was done in the early period of the knowledge of intramedullary surgery and the proper procedure should have been to have excised the tumor outside of the cord and to have left the remainder in situ. It was always most inadvisable to attempt to enucleate a tumor when partly embedded in the cord substance, because even with the gentlest manipulation there was severe trauma to the cord. Recovery from the second operation was normal but the patient presented within twenty-four hours all the symptoms of complete transverse lesion of the cord with paralysis of all the extremities and loss of all reflexes. This condition persisted; she developed large bedsores and a severe cystitis, had irregular fever from the cystitis, the bedsores lasted for many weeks and her condition was deplorable. She remained so for several months, and then gradually improved. The lower limbs, however, gradually became spastic, and by April of the following year were markedly contracted, and flexed at the knees and hips almost to the body. Finally, an attempt was made to ameliorate her condition somewhat by posterior root section for the spasticity of the lower limbs. On April 2, 1913, laminectomy was done, and the second, fourth and fifth posterior roots on each side were divided. The patient recovered satisfactorily from this operation and the contractures in the lower limbs gradually relaxed so that within two months the legs were fully extended. For about two years she had little power in her lower limbs but considerable return of power in her upper limbs, and her condition was considered hopeless. In 1918, she returned to the hospital remarkably improved. The power in her upper extremities was now normal and she had good power in her lower extremities excepting for a slight limp on the left side when



she walked. She has remained in excellent condition since that time and she was presented at the meeting, and walked around without any trouble, with only a slight limp. The patient was presented in order to show what remarkable recuperative powers the spinal cord has even after a number of years, what can be accomplished by surgery, and finally as an evidence of the dangers of intramedullary surgery.

Dr. Byrne remembered seeing this case at the Neurological Hospital some years ago before she went to Mount Sinai for the second operation. At that time she had very poor use of her limbs and he tried to think of some reason to account for this. He concluded that the interference with cord function was the result of an inflammatory reaction following the evulsion of the tumor at the first operation in that region and the cord succumbed, a condition similar to spinal shock. He thought the case remarkable as illustrating what surgery could do for one so helpless. Considering the condition in which he saw the patient, one would have thought it almost impossible that anything could have been done to restore function to the degree that she now enjoyed.

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A CONSTRUCTIVE PLAN FOR ADVANCEMENT IN NEUROLOGICAL THERAPEUTICS. (Address of the President-Elect.) Delivered by DR. WALTER TIMME.

Dr. Timme deplored the fact that neurology had made only moderate advance in recent years, the real advances in this special field having been made by other than neurologists; as, for instance, the spirochete in paresis, demonstrated by a bacteriologist, and arsphenamin introduced by a biochemist. Neurologists should be far ahead on the highway of modern advance, and recognition of their failure to be in the vanguard would, it was earnestly hoped, bring about constructive changes and plans for the immediate future. A glance at recent transactions of neurological societies would show the fairness of this criticism, which was intended to be constructive, not destructive, and which referred not to any one or any group, but to all as a collective unit. These transactions were clouded in a maze of qualifying phrases, limiting applications and newly coined terms which prevented in many cases any approach at understanding. Another disconcerting feature to be found in them was the reduction of individual experiences to statistical tables. When a man reduced his observations—say of disseminated sclerosis—to figures, apportioning a certain percentage to respective types, grouping them under certain symptoms, etc., it would appear that he felt that this was the end of the subject for him, and this represented his attitude toward his patient. Once let the diagnosis of disseminated sclerosis be made and all further interest in the patient was lost. This might be cited about almost any other organic neurologic condition. It was this method of closing a subject that had led organic neurology into a box cañon from which there was no escape ahead but all egress must be made by retreat.

Such a condition of affairs was not found in other fields of medicine; witness the introduction of serum therapy, of protective vaccines, the discovery of the hemolytic reactions, the invention of the electrocardiograph and other epoch making advances. Against these advances in other fields of medicine neurology could show nothing in the cure of conditions that should be considered within its particular domain. As for the neuroses all that was done for them was to classify and reclassify them, and the psychoses were regarded in terms of terminology and statistics. The paths for emergence



toward the light were occupied by other than neurologists; the endocrinologists were concerned with the dystrophies, the myopathies and the asthenias, and the subject of visceral neurology belonged almost exclusively to them. Poliomyelitis had become the concern of the pediatricists and orthopedists. The genito-urinary specialist included neurosyphilis in his domain. The dentists cured the spondylites, the neuralgias and reached out for the insanities. The psychanalyst made heroic attacks on every single condition coming under the category of neurology and psychiatry, and frequently with success. It was time for the neurologists to join the order of the day and become revolutionists. It should not be difficult to get together in a spirit of harmony and cooperation and formulate a plan whereby methods of stagnation should be abandoned for those of active endeavor and accomplishment.

Dr. Timme suggested the following as a constructive plan of action: Why could not an authoritative body representing American neurology choose from among its members a number to whom would be assigned a specific neurologic disease or syndrome for treatment? Each member of such a group might take a subdivision of the subject chosen and bring it up to date. A year might be allowed for the work. At the end of that time, there would be accessible in compact form all that had been written on that disease throughout the world to date. Two such groups a year would soon give to neurology a series of archives which would be invaluable as starting off places for investigation. The concrete method of obtaining the best results in a short time might very well be initiated by the New York Neurological Society in collaboration with neurological units elsewhere throughout the country. The publication of such exhaustive reviews might then be properly within the scope of the American Neurological Association.

A second recommendation, a corollary to the former, might be of value in fostering a spirit of research and investigation. This would embody the reward of a prize for the greatest yearly advance made in some neurological subjects, or for the winner in a competitive essay.

By these two means, an immediate direct stimulus would be applied to American neurology which would give to it a dynamic character and which would be cumulative as it progressed. There was a broadening scope for American neurology and a great desire for unification of neurologic interests, particularly in this city, which would make it the center of neurologic thought and advance. The immense economic factor that problems in neurology and psychiatry had become in modern organizations had been made plain through the great war and a tremendous awakening in all branches of these sciences was already manifest. The position, the power and the ability to encompass this great end were only awaiting the will to utilize them.

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THE LESIONS ENCOUNTERED IN OPERATIONS FOR OLD INJURIES OF THE SPINAL CORD: WITH REMARKS ON THE INDICATIONS FOR TREATMENT AND RESULTS OBTAINED BY SURGICAL INTERFERENCE. (With Lantern Slides.) Presented by DR. CHARLES A. ELSBERG.

Among 200 spinal operations performed at the New York Neurological Institute and at Mount Sinai Hospital, a number of old traumatic lesions had been encountered, which could be divided into those which involved the membranes and those of the cord and roots. Combinations of these types were often observed in a single patient. Many injuries to the vertebral column

and spinal cord produced an irremediable cord lesion, but in a small number it was not severe so that improvement was possible and some of these required operative interference. Changes in the dura frequently resulted from trauma to the spine. The dura might be much changed and so greatly thickened that it exerted pressure on the cord, in which case excision of the thickened part might be followed by improvement of the symptoms. The appearance of the dura might be so altered as to be mistaken for an extradural neoplasm; great care in excising it should be taken in order to avoid injury to the cord beneath. The cord might be adherent to the dura and the arachnoid sac obliterated, or the arachnoid sac found to be shut off above and below the lesion. Calcareous deposits on the inner surface of the dura might cause some root pains or marked cord symptoms. They should be removed, but great care should be exercised for they were often firmly attached to the surface of the cord. Sometimes symptoms very like those of extradural neoplasm were caused by a mass of scar tissue formed from adhesions between the pia of the cord and the dura. Part of this cicatricial tissue might be so firmly adherent to the cord that the only course to pursue was to make parallel incisions through the scar tissue. Cicatrices in the dura, especially around the cauda equina, might cause severe root pains; excision of the scar tissue would usually relieve the symptoms, but it might sometimes be necessary to divide or excise the affected roots.

The changes observed in the arachnoid varied widely. Sometimes it was slightly thickened and cloudy; at other times, a localized area on one or the other side of the cord was thickened, cloudy and adherent to the inner surface of the dura. More often, the arachnoid was not only thickened and adherent to the dura, but had also formed adhesions to the spinal cord so that cavities filled with fluid might result. New blood vessels were apt to be formed if these arachnoid changes occurred in the neighborhood of the posterior nerve roots. In those patients where the arachnoid was destroyed and the arachnoid sac obliterated in the traumatic area, the subarachnoid space was found to be shut off above and below and filled by pent up cerebrospinal fluid.

The appearance of the spinal cord months or years after injury also varied widely. Extremely small gross changes might produce very severe symptoms and very marked loss of function. The cord, however, often appeared larger than normal and its consistency less firm. Signs of an abnormal amount of fluid within were observed where there was a cavity in the cord. The largest cavities were usually seen in the lower dorsal lumbar and sacral regions. In some of these patients drainage of the fluid into the subdural space might result in great benefit to the patient. Very marked cord symptoms might be caused by distortion or narrowing of the spinal canal by new formed or dislocated bone. The cord might be stretched over a projecting mass of bone and be also subjected to pressure in which case marked cord symptoms might result. Great improvement had often followed the removal of the projective piece of bone, and the marked angulation described might be overcome by wide decompressive laminectomy.

There was no well supported evidence that the tissues of the cord could regenerate; therefore, operations for complete division of the spinal cord should never be attempted.

Indications for operative interference in lesions following old injuries of the cord could be summed up as follows: (1) Surgical relief was impossible if symptoms of complete transverse lesion had existed from the time of the trauma; (2) there was no hope of benefitting a patient with symptoms and

signs of incomplete cord lesion who had large bedsores and was much emaciated; (3) individuals who had improved but still had paraplegia should be operated on unless there was dissociated disturbance of superficial sensation; (4) if there was considerable return of power, but locomotion was still interfered with by the spasticity which had become stationary, operation was followed by satisfactory results, and (5) severe root pains, if they could not be otherwise relieved, might demand operative interference. Among the last 200 laminectomies performed by Dr. Elsberg, twenty operations were done for spinal lesions due to old trauma to the vertebral column. Of these, eight were completely relieved of symptoms and six were greatly improved. In six there was little or no improvement.

#### DISCUSSION

DR. WALTER F. SCHALLER complimented Dr. Elsberg on his excellent and timely presentation of a subject of interest to all neurologists. He considered it quite possible that in post-war surgery there would be an increasing number of these old spinal injuries as compared with former times. In recently reviewing the war injuries of the spinal cord he had been impressed by observations of certain conditions with which he had had no personal experience and he wished to ask if Dr. Elsberg had ever noted such cases. For instance, the presence of meningeal adhesions had been noted developing soon after gunshot injuries both above and below the wound and this explained the rarity of serious complicating meningitis in these cases. Further, the presence of circumscribed serous meningitis was often referred to in traumatic spinal cord conditions, and the speaker wished to know if Dr. Elsberg had encountered this condition frequently.

DR. HYMAN CLIMENKO said that some three or four years ago, together with Dr. Newhoff he made a study of a group of cases of old injury to the spinal cord, and obtained some results that might be of both medical and legal value. One patient, a painter, aged 40, had fallen from a scaffold and suffered from a complete paraplegia. He was confined to bed for about eight months when he began to improve gradually and steadfastly until at the end of about one year he was able to return to his work. Four years after the injury the symptoms of paraplegia returned and the patient was sent to the Central and Neurological Hospital. Here he presented a typical picture of spastic paraplegia with distinct level symptoms. Operation was performed by Dr. Newhoff who found a thickened dura with numerous adhesions. A piece of dura was excised and the adhesions freed. The cord did not appear to be badly damaged. The patient made an uneventful recovery from the operation, his paraplegic symptoms rapidly improved and within less than two months he was able to leave the hospital and return to his work. Within a year he returned, again paraplegic. The symptoms now had developed considerably. This case illustrated the fact that one must be careful about giving a good prognosis in court proceedings in so-called cured traumatic paraplegias. This case was also in accord with the observation quoted by Dr. Schaller regarding adhesions above and below the level of the traumatic lesion. Another remarkable case was that of a Negro who suffered from a syphilitic paraplegia. Specific treatment had no effect and operation was decided on. Here, too, adhesions were found and freed and the patient improved for awhile. The symptoms, however, soon returned. In this series also there was a case of multiple sclerosis with level symptoms. A laminectomy apparently helped the patient considerably, but the symptoms soon returned.

All these cases were under observation for a considerable length of time and, in general, it might be said that they all improved after operation, though sensation returned much more and earlier than motor powers. The pathologic findings in these cases were almost the same as those seen by Dr. Elsberg.

DR. ELSBERG assured Dr. Schaller that he had been on the lookout for so-called circumscribed serous meningitis. He had seen it in patients with injuries affecting the dura, but the process usually involved the arachnoid membrane and not the pia mater. Whenever he had seen an inflammatory process of the pia inside the arachnoid, he had considered the process as : meningo-myelitis. He had seen collections of fluid in the arachnoid sac, and felt it was due to an inflammatory process and adhesions of the arachnoid and not of the pia. After old severe injuries one might meet with adhesions between all the membranes and the cord, and he had long ago learned that in cases of that kind operative interference did no good.

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PREVALENCE OF INFECTIOUS LETHARGIC ENCEPHALITIS. Presented by DR. I. ABRAHAMSON.

The speaker called attention to the alarming frequency with which this condition was now being encountered in private practice throughout the city. Various types had been established. Among them was a type where the third nerve was involved, or the pons and medulla, paraplegia or hemiplegia. There was a type with involvement of the cervical cord. One case he had seen was an acute Parkinson's disease beginning with diplopia and ptosis, in a highly intelligent man who had been absolutely without symptoms before, whose statements were fully corroborated by his wife.

Dr. Abrahamson had just received the discussion of infectious encephalitis which preceded an attack of influenza on the other side and which the Royal Medical Society had studied. The report was dated Oct. 22, 1918, and Sir William Osler, Dr. George Draper and Col. James Newsholme were members of the committee. They first studied the cases from the point of view of botulism and found they could exclude it. They then considered the relationship of the condition to poliomyelitis, but it was found to differ very materially; animal experiments were done but in no case did they get any picture resembling poliomyelitis. The condition was *sui generis* and differed from all analogous conditions.

There were many of these cases in New York at present. The distinguishing features were lethargy in all grades of encephalitis. This was an important and really infectious disease and the Neurological Society ought to do something as a body to study it. The speaker moved that a committee be appointed to get in touch with the Board of Health and make this a reportable disease, and also to go to the various hospitals and study these cases individually and in groups, and perhaps be successful in isolating the infectious agent, which was probably of the same nature or allied to the so-called influenza.

DISCUSSION

DR. WILLIAM LESZYNSKY said that he had seen a number of these cases of lethargic encephalitis accompanied by symptoms of polio-encephalitis and that the prognosis was favorable. He nevertheless approved the move to appoint a committee to study the condition.



## BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Regular Meeting, Jan. 17, 1919

CHARLES G. DEWEY, M.D., *Chairman, pro tem.*

## PESSIMISTS, PSYCHOPATHIC AND NON-PSYCHOPATHIC, SIGMUND FREUD, PESSIMIST: REVIEW OF "WAR AND DEATH."

Presented by DR. E. E. SOUTHARD.

Dr. Southard gave a review of Freud's book, "War and Death," translated and published by Dr. A. A. Brill and Mr. A. B. Kuttner in 1918. He quoted from the translators' brief preface, "This book is offered to the American public at the present time in the hope that it may contribute something to the cause of international understanding and good will which has been the hope of the world," and then stated the thesis of the whole publication, "those who are not selfish and cruel are hypocrites. Selfishness and cruelty are the indispensable elements in man to which, repressed by civilization, we regress under the influence of war." Further quotations from the book were given, several of which follow: "Civilization is an illusion dashed to pieces by collision with a bit of reality." "States and races" have in the war "abolished their mutual ethical restrictions" so that they have been observed "to withdraw from the pressure of civilization." "Our conscience is not the inexorable judge that teachers of ethics say it is; it has its origin in nothing but 'social fear,'" and "civilization is based on hypocrisy." These quotations were introduced to throw some light on the philosophy of the author.

Dr. Southard then classified the great pessimists and optimists of history as follows, several of the names appearing in both lists because of the use of their teachings later by both groups:

## MAJOR OPTIMISTS

Plato  
STOICS  
Leibnitz  
Rousseau  
Kant  
Hegel  
Darwin

## MAJOR PESSIMISTS

Plato  
EPICUREANS  
Voltaire  
Rousseau  
Kant  
Schopenhauer  
Darwin

## MINOR PESSIMISTS

V. Hartmann

Nietzsche

Freud

The speaker then took up the history of pessimism and spoke of the philosophy and psychopathic traits of a number of the great philosophers. He spoke especially of Rousseau, who maintained that man was naturally good but was rendered evil by culture and advocated the back to nature plan. This idea is the reverse of Freud's, who claims that man by nature is bad and can only hope for a little "sublimation" by the obscure processes of history.

An analysis of the book of "War and Death" was taken up from a purely philosophical point of view. Freud maintains that evil is the indestructible element in man and as an apologist for the war, Freud must be considered philosophically a pessimist. The book also is replete with quotations attempting to place the responsibility of the war equally on England and Germany.



The philosophy of Freud was then compared with that of Mrs. Eddy, as shown below.

EDDYISM	FREUDISM
Idealistic	Materialistic
Indeterministic	Deterministic
Optimistic	Pessimistic
Evil, illusory	Good, illusory
Forget	Recall
Spiritual and Absent Treatment	"Catharsis," intimate reeducation
Disease a delusion	Disease a flight from reality

Dr. Southard closed the discussion by asking if the American people will ever awake to the fact that pessimism—not militarism, devil worship—not soldier worship—is the philosophy and religion of Germany. He said that his point was not to show that Freud and Germans were psychopathic but that they were philosophically pessimists.

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THE ARTERIAL TENSION IN MENTAL DISEASE. Presented by  
DR. CLAES ENEBUSKE.

The speaker gave a brief discussion of this topic. As long ago as 2500 B. C., the Chinese physicians noted the quality of the pulse, which we now designate as tension. For thousands of years pulse frequency and body temperature have been recognized as indices of disease.

In recent literature the usual designation of normal pressure ranges from 91 to 160 mm. of mercury. This, he said, varies considerably with the technic used. Observation of arterial tension in mental disease is as important as are observations of pulse rate and temperature.

The results of observations during fourteen years were given. He said that in 953 measurements of the arterial tension in twenty-eight cases of manic-depressive insanity, if the radial artery tension became spontaneously stabilized at 150 mm. of mercury, there would be neither manic nor depressive symptoms. In 5,046 measurements of the maximum radial artery tension in 130 cases of dementia praecox, if the tension became spontaneously stabilized at 150 mm., there were no evidences of praecox in acute or sub-acute state. In eighty-five cases of pulmonary tuberculosis, when the maximum tension of the radial artery became spontaneously stabilized at 150 mm., there was no active tuberculosis present. These readings were made in all the major groups of mental disease. The feeble-minded show values closely approximating normal. The return to normal pressure in the manic depressive is much like the return of the temperature to normal after an infectious illness. He said that a spontaneously stable arterial tension of 150 mm. of mercury at the radial artery is the normal tension. Only an occasional case of dementia praecox recovers spontaneously a normal tension.

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FATIGUE. Presented by DR. SIDNEY A. LORD.

Dr. Lord read the paper of the evening on this subject, remarking that the condition is omnipresent, the signs and warnings of its approach, the tokens of its arrival and the ear-marks of its existence are, or are supposed to be, plain as day. Yet very little attention is paid to it. Everyday matters, the necessary and inevitably constant activities of life are its begetters. We are wise in theories of fatigue but often not in practice.

The term as used clinically denotes conditions of widely different degrees of development and seriousness. As used by the reader, it denotes a normal state of diminished activity due to overactivity. Exhaustion designates over-fatigue, fatigue which has lasted longer than it would have, had rest been instituted and recuperation started at the correct time.

McKendrick, treating of the physiology of the cell in relation to its reaction to repeated stimuli, ventures the opinion that qualitative changes in the stimuli are not necessary to produce qualitative changes in tissue. The conception is that physical stimuli, repeated too often, too long, or too hard, may produce pathologic change. Prolonged stimulation produces phenomena which are quite foreign to the normal vital phenomena of the cell in question and all stimuli act primarily only as exciting or as depressing agents on the normal processes of life. This view accords with that held by Sherrington in his discussions of the physiology of the spinal cord and the principle of the final common path, for "if two conductors have a tract in common, there can hardly be any essential qualitative difference between their modes of conduction." Theoretically, then, pathologic states can be derived from normal conditions through increase in amount. The transition from normal fatigue to abnormal, from natural tire to exhaustion, is but one of imperceptible gradation.

The effects of fatigue are dissipated continuously. Doubtless there is great variation inborn in different individuals as to the rapidity with which they handle the fatigue products. It is also evident that toxic factors other than the fatigue products can work to the detriment of the cell.

Local and general fatigue were considered. Products generated in local fatigue may be taken up by the circulation and a general or distant reaction started. The reader referred to three types of fatigue; the mental, physical and moral and remarked that the more one studies the phenomena of fatigue in its broad applications, the more he becomes convinced of its power to produce widely distributed variations of function. Overstimulation of nerve cells experimentally is known to produce definite changes in the appearances of such cells; they shrink, the nuclei become smaller, the protoplasm takes on acid stains more readily than normal, etc. It is also true that basic as well as acid products are responsible for fatigue phenomena.

Clinically there is need in every case to ascertain the problem of fatigue in that particular individual as contrasted with his ability to stand activity. Fatigue should be given a first place in the consideration of the cause of disease, it should be in the foreground of the clinician's mind. Determination of over-use (over-much, over-long, over-quick) must be made.

The feelings of weariness, impaired capacity, gross physical fatigue, and altered behavior are signs of fatigue and call for attention. Normal fatigue as a human experience is elusive of definition; certainly there is a normal fatigue for a normal man. Normality of fatigue probably depends on the point of view. Normal fatigue should be pleasurable, a warning to rest should not be noxious to the mind. The products of fatigue are poisonous only in a restricted sense. The fluctuations of attention, the gradual loss of efficiency and capacity; distractibility, loss of discrimination, poor recollection and impoverished imagination are merely signs of oncoming fatigue and exhaustion and later are replaced by uncomfortable sensations and reduced functions which finally lead to pain and discomfort. The vegetative system takes part in the reaction also; the respirations become shallow, there are various external and visceral manifestations, irritability of the cardiac accelerator

mechanism, tachycardia, the "irritable heart" and neuro-muscular asthenia as seen in the war, etc. The exhaustion phenomena cannot be considered as a true neurosis. Such cases require careful study and treatment and unlike all fatigue cases, require gradually increasing exercises.

Fatigue in children is not sufficiently considered. Schools are standardized for average vitality but the standard of total accomplishments is too high; the pace on the whole is set by the strongest and others follow as best they can. Already, however, there is a trend of public opinion against the present system growing out of a recognition by educators and physicians of the fundamental dangers and faults of the present system. Classes in the schools should be divided according to fatigability of the children in line with the present mode of separation on mental grounds, and the schemes for testing efficiency in adult employment.

Many conduct anomalies can be ascribed to fatigue. In over-worked individuals, hard pressed by the stern demands of modern life, driven by the forces of circumstances, exhausted and fatigued, with loss of sleep, absence of opportunity to rest at will, worries necessitated by the struggle, normal character and behavior responses are hardly to be expected. With loss of health a possibility, with the power of recuperation slipping away, with capacity and efficiency diminished, the morbid state can well be appreciated and the inevitable result points toward the formation of conflicts.

The recognition and appraisal of such conditions is not easy. Laboratory tests are not available and are too time-consuming to be of value. Pains-taking examination to determine the amount of fatigue present is the only feasible way. Tests for cardiac and muscle fatigue are available, to be sure.

The treatment of the cases is variable, some individuals require complete recovery every twenty-four hours or they decline. The accumulative effects of fatigue may go so far as to make recovery doubtful. There is even danger of pushing too hard without evidences of fatigue arising, especially in conditions associated with the psychic drive. The necessity of complete recovery from fatigue each day was strongly emphasized. Regulation of activity itself is important, the intensity of work, the speed with which it is done, etc., call for consideration of those interested in the plan of conservation. In health, feelings and sensations may be true guides to conduct but surely in disease, they cannot be considered. An attempt should be made to regulate activities so as not to produce fatigue. Inability to sleep may itself be an evidence of exhaustion—an abnormal fatigue.

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#### BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

*Regular Meeting, Feb. 20, 1919*

GEORGE A. WATERMAN, M.D., *President*

#### NON-DEMENTIA NON-PRAECOX: A NOTE ON THE ADVANTAGES TO MENTAL HYGIENE OF EXTIRPATING A TERM. Presented by DR. E. E. SOUTHARD.

Dr. Southard said that there were some people who chose to take away all terms that were not useful, surely there are many terms that are not exact. Probably the worst term we have in psychiatry is "dementia praecox," no one disagrees as to its badness. Kraepelin has been noted for the poor terms he has introduced and a priori, this term, which Kraepelin suggested,

should be bad. The reader said that some international committee on psychiatric terminology should be formed to select desirable nomenclatures.

In dementia praecox, neither dementia nor precocity in any sense are necessary. It is a term that brings much unhappiness to patients on whom the diagnosis is made and much wrong results from its use. It should not be used just as syphilis should not be diagnosed as such because of the harm done, though every one knows its relationship to general paresis. It is hard to label dementia and it does not have to be present in dementia praecox.

Catatonia was first described in 1858. Kraepelin in 1896 synthesized several types of mental disease into the dementia praecox group. In 1913, he evolved thirteen types which he designated as endogenous deterioration and in the group were nine types of dementia praecox and four of paraphrenia. Blueler has later suggested the term schizophrenia and it should be used instead of the undesirable one, dementia praecox. It is a good root for various derivations and conveys the idea which is most important in the disease, splitting of the personality. Its use does not commit one to any notion of the mechanism involved nor to any theory of the nature of the process. So far as he knew, there was no objection to the term replacing dementia praecox in clinical work or statistics and much to be said in its favor.

#### DISCUSSION

DR. E. STANLEY ABBOT said that the term dementia praecox was quite undesirable, but the fact remains that many of the cases do go on to dementia. He recognized the danger to an individual of having the diagnosis made on him, but errors in diagnosis should not be sufficient reason for removing a term. That very feature rather tended to develop care in making the diagnosis and necessitated the more clear definition of symptoms and more care in making the diagnosis. Science develops by delineation, not by substituting terms. He felt that no advantage could be gained by substituting schizophrenia for dementia praecox, for the former has a connotation far wider than the latter. What is desirable is to have a term which designates those who do not dement from those who do. Moreover, the mere diagnosis is of secondary importance, for one should attempt to do all he can for a patient even though the diagnosis of dementia praecox has been made.

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#### A CASE BEARING ON THE JAMES-LANGE THEORY OF THE EMOTIONS. Presented by DR. A. MYERSON.

Dr. Myerson discussed a case bearing on the James-Lange theory of the emotions. The James-Lange theory of the emotions, in contra-distinction to the Introspectionist and Intellectualist schools, states that the essential features of any emotion are its bodily manifestations. One feels sorry, according to the theory, because he weeps and is afraid because he runs away.

The case discussed illustrated the fact that feeling itself may be absent from consciousness. The patient cries and laughs without being either sad or glad; though she weeps, she does not feel sorry; though she laughs, she does not feel happy. In addition to the absence of emotions, the fundamental organic sensations—fear, anger, hunger, thirst, sex desire and fatigue—were absent. Psychic pleasure and pain also were not present though absence of these feelings was recognized.



The patient was a single, Anglo-Saxon woman of 32. The family history was negative; early life uneventful. She had always been "nervous," temperamental and sensitive. She was artistic and emotional. After a love affair at 25, the patient returned to her home in Georgia and suffered a "nervous prostration," characterized by easy fatigability, "hysterical" attacks, seclusiveness, depression, introspection, headaches, etc., and later she became delirious and confused. Since then she has known no affection, no patriotism, no emotional pain.

Physical examination was negative. She impressed the examiner as over-emotional, judging from the face, voice, laughter, tears, respiration, etc.; objectively she seemed emotional. But she had no sense of hunger, fatigue, thirst, sleepiness; she eats, drinks, rests, sleeps out of pure force of social custom. She showed every reaction to fearful circumstances, but never experiences fear. The pleasures of anticipation and realization of activity and relaxation, the things which give variety, color and joy to life have disappeared. No evidences of any psychosis were present. It seemed unlikely that she pretended to have no feeling or that she was attempting to deceive herself.

The changes of emotion are conspicuous in hysteria, manic-depressive, the psychoneuroses (the "anhedonia" of Ribot), in some phases of dementia praecox, in organic brain disease involving the basal ganglia and the type of case here noted. What seems important is that the emotional expression seems reflexly excited by the environment with adequate conformity of conduct but without feeling resulting. This case evidently is one of permanent dissociation of affectivity from the other links of emotion.

#### DISCUSSION

DR. DONALD GREGG raised the question as to whether the features in this case were not analogous to those seen in fatigue and in some cases of habit alone. The conditions here might be likened to an artificial anesthesia, affecting especially the emotional sphere.

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#### UNIFORM STATISTICAL REPORTS ON INSANITY NOW ASSURED. AN OFFICIAL CLASSIFICATION OF PSYCHOSES. Presented by DR. JAMES V. MAY.

The speaker said that psychiatric progress has been hampered by an unfortunate absence of accurate scientific information on which to base deductions regarding the mental diseases. We find ourselves overwhelmed with theories of these diseases and confronted with a startling absence of established facts. Psychiatric problems are voluminously discussed by some even widely recognized writers whose actual knowledge of the care and observation of insane patients has been insignificant, or derived from sources long since considered inaccurate. Personal opinions are often advanced as facts. Textbooks are filled with unsubstantiated statements about the frequency of various forms of insanity and the recovery rate of the different psychoses, derived from personal observations or the statistical data of single hospitals. Only by general and accurate statistical studies can we arrive at conclusions of value in these matters which are so important for the proper development of psychiatry.



The etiology of insanity has long been a matter of discussion. Well known authorities widely disagree. Heredity is looked on as one of the most important factors and it probably is. But to just what extent it is responsible in the various psychoses can only be learned by careful statistical studies. The part played by the mendelian ratios requires investigation. The importance of mental defects and insanity as related to criminality, prostitution, alcoholism and pauperism is now generally accepted. But just the extent can only be learned by careful statistics. The infrequency of psychoses due to single drugs is remarkable, but few reliable figures are available.

Our knowledge of the epileptic psychoses is perhaps the most discouraging of the problems of psychiatry. We know that nervous and mental diseases, feeble-mindedness and alcoholism are prominent in the family history of epileptics. Attention has been called to the so-called "epileptic constitution" by L. Pierce Clark and others. There is no satisfactory classification of the epileptic psychoses. In many of them, there are associated psychoses which are incidental to the epileptic features. To clarify this confusion, accurate statistics, carefully and accurately analyzed, must be obtained.

There is very little reliable data relating to the psychoneuroses. Constitutional psychopathic inferiority is now recognized by the government as an adequate reason for rejection of immigrants. The relation of this condition to the psychoses is very little understood. Information at present available on the frequency of different forms of psychoses and their recovery rate is almost useless. The peculiarity of certain of the psychoses to certain races, communities and stages of life has long been emphasized. The facts of such claims are still to be demonstrated in many instances. An analysis of the 200,000 and more cases in the institutions of this country according to one standard would help much to settle some of these problems.

The cost of the care and maintenance of the insane is in itself a question of importance and legislative investigations of this matter are frequent. Some states include cost of repairs and improvements in the cost of maintenance, some deduct all receipts for reimbursing patients, others take into consideration the value of articles produced in the industrial departments and the value of farm products. Discrepancies in the per capita cost of the various hospitals are often merely matters of book-keeping.

Correlation of the statistics of different states has been difficult owing to the multiplicity of methods of administration, some states having central control, others having none. In some states the control is vested in commissions; in others, the control is held by the State Board of Charities, etc. The statistics submitted by each organization have followed no uniform classification of mental diseases and chaos has been the result.

Repeated efforts to correct this situation have been made. At the annual meeting of the American Medico-Psychological Society in June, 1913, a committee was formed to draw up a plan for compilation of data on the insane in the institutions of the United States and Canada. This committee reported at the meeting in 1917 a set of tables and classification of mental disease to be used by all the institutions. Since the official adoption of these statistical tables, the Association's committee has prepared an elaborate manual explaining their use, intended to explain any questions which may arise in connection with the use of the classification or the statistical tables.

Dr. May read excerpts from the report of the committee and read the classification of mental diseases as adopted and which are given in the manual (only the main headings are given below; the complete classification is given

in the manual, which can be obtained from the National Committee for Mental Hygiene, 50 Union Square, New York).

1. Traumatic psychoses.
2. Senile psychoses.
3. Psychoses with cerebral arteriosclerosis.
4. General paresis.
5. Psychoses with cerebral syphilis.
6. Psychoses with Huntington's chorea.
7. Psychoses with brain tumor.
8. Psychoses with other brain or nervous diseases.
9. Alcoholic psychoses.
10. Psychoses due to drugs and other exogenous toxins.
11. Psychoses with pellagra.
12. Psychoses with other somatic diseases.
13. Manic-depressive psychoses.
14. Involutional melancholia.
15. Dementia praecox.
16. Paranoia or paranoid conditions.
17. Epileptic psychoses.
18. Psychoneuroses and neuroses.
19. Psychoses with constitutional psychopathic inferiority.
20. Psychoses with mental deficiency.
21. Undiagnosed psychoses.
22. Not insane.

The practical operation of this plan has been assured by the establishment of a Bureau of Statistics of the National Committee for Mental Hygiene, and their work is coordinated with a similar committee of the American Medico-Psychological Society. The commissions and central boards of control in a large number of the states have adopted this classification. Of the 156 state hospitals for the insane in the country, 145 have adopted the plans.

The success of this important movement appears to be definitely assured and unquestionably constitutes one of the greatest developments of modern psychiatry.

#### DISCUSSION

DR. E. E. SOUTHARD said that there had been much criticism of the classification of mental diseases as adopted and presented by Dr. May. He was much displeased by it. But it was the best that could be developed at the time and has brought some form of agreement out of the previous chaos and does mark a definite step in the right direction. Provisions have been made to attend to all changes which, in the light of future developments, may be necessary and the present scheme does form a good working basis. He said that many people do not distinguish between a terminology and a classification. The proposed grouping of the diseases is a classification. The errors in the plan are those of omission rather than commission and can readily be adjusted in time.

DR. E. STANLEY ABBOTT, a member of the committee which framed the classification, said that the entire committee was dissatisfied with the results of their work but that they had adopted compromises and finally drew up the classification which seemed to be the most satisfactory for every purpose. It seemed to be workable and as such was submitted. Some classification is needed if accurate statistical data is to be collected; from the plan submitted

the most comparable data could be collected. The classification is far from final, and the purpose of a standing committee was to take care of all suggestions made which aimed at improvement of the scheme.

DR. H. B. HOWARD said that all classifications were the result of compromises, and for that reason do not satisfy every one or any one. But they may still form a good working basis for statistical studies. He said many criticisms arose from those who had not familiarized themselves with the aims of the classification or the keys to be followed; it is important to study the manuals of classification before one criticizes their contents and aims. One very good feature of the present plan is the establishment of a permanent committee to attend to points of controversy and amplification as time goes on.